

INDOOR AIR CLEANING SYSTEM WITH NETWORKING MECHANISM

FIELD OF THE INVENTION

[0001] The present disclosure relates to an indoor air cleaning system with a networking mechanism, and more particularly to an indoor air cleaning system with a networking mechanism for implementing air pollution detection and complete purification in an indoor field.

BACKGROUND OF THE INVENTION

[0002] Suspended particles are defined as the solid particles or droplets contained in the air. Due to their extremely fine size, the suspended particles may enter the lungs of human body through the nasal hair in the nasal cavity easily, causing inflammation in the lungs, asthma or cardiovascular disease. If other pollutant compounds are attached to the suspended particles, it will further increase the harm to the respiratory system. In recent years, the issue of air pollution has been increasingly severe, especially with consistently high concentrations of suspended particles (e.g., PM_{2.5}). Therefore, the monitoring to the concentration of the gas suspended particles is taken more and more seriously. However, the gas flows unstably due to the variable wind direction and the air volume, and the general gas-quality monitoring station is located in a fixed place. Under this circumstance, it is impossible for people to check the concentration of suspended particles in current environment.

[0003] Furthermore, in recent years, modern people are placing increasing importance on the quality of the air in their surroundings. For example, carbon monoxide, carbon dioxide, volatile organic compounds (VOC), PM_{2.5}, nitric oxide, sulfur monoxide and even the suspended

particles contained in the air are exposed in the environment to affect the human health, and even endanger the life seriously. Therefore, the quality of environmental air has attracted the attention of various countries. At present, how to detect the air quality and avoid the harm is a crucial issue that urgently needs to be solved.

[0004] In order to confirm the quality of the air, it is feasible to use a gas sensor to detect the air surrounding in the environment. If the detection information can be provided in real time to warn the people in the environment, it is helpful of avoiding the harm and facilitates the people to escape the hazard immediately, preventing the hazardous gas exposed in the environment from affecting the human health and causing the harm. Therefore, it is considered a valuable application to use a gas sensor detecting the air in the surrounding environment.

[0005] In addition, it is difficult to have the surveillance and control the indoor air quality. Besides the outdoor air quality, the indoor air-conditioning conditions and the pollution sources are the major factors affecting the indoor air quality. It is necessary to intelligently and quickly detect indoor air pollution sources in various indoor fields, effectively remove the indoor air pollution to form a clean and safe breathing gas state, and monitor indoor air quality in real time anytime, anywhere.

[0006] In view of this, a purification device is required and disposed for implementing air pollution detection and complete purification in an indoor field, so as to realize the indoor air pollution prevention and control system. In addition, the purification efficiency of a general purification device for cleaning air pollution in the space is about 20~1000 clean air delivery rate (CADR). Therefore, it takes a long time to purify the air in an indoor space. If the purification process time needs to be accelerated, it is necessary to increase the number of purification devices to increase the

processing efficiency, and the installation cost is increased correspondingly. On the other hand, in case of that too many purification devices are added, it results in a waste of installation costs. Moreover, general purification devices cannot achieve real-time monitoring and effective treatment anytime and anywhere. Therefore, in order to achieve the best air purification treatment efficiency and installation cost in such a large space, how to set up the best purification device is the main subject of the present disclosure. Thereby, the application of indoor air pollution prevention and control system in the space of the indoor field is realized to detect the air pollution, purify the air pollution completely, reduce the harmful gas inhaled indoors, eliminate the air pollution through real-time detection and monitoring, effectively control the energy-saving benefits of the operation of the purification device, and quickly purify the indoor air.

SUMMARY OF THE INVENTION

[0007] One object of the present disclosure is to provide an indoor air cleaning system with a networking mechanism for implementing air pollution detection and complete purification in the space of an indoor field. A plurality of gas detectors, at least one gas molecule control hardware device, at least one air conditioning device, and an Internet-connected cloud computing service device are disposed in an indoor space. The gas detectors are arranged in the indoor field and the outdoor field. Moreover, each of gas molecule control hardware device and each of air conditioning device is equipped with the gas detector that is connected to the cloud to form an intelligent linkage system. Real-time linkage control is implemented to control actuation of air guiding fan in the gas molecule control hardware device and the air conditioning device, the air quality of space in the indoor field is monitored anytime and anywhere, and the air

conditioning device is used to control the temperature and humidity in the indoor field. The indoor air cleaning system with the networking mechanism is established in this way to obtain the room temperature in the indoor field, achieve zero difference of carbon dioxide (CO₂) in the indoor field and the outdoor field, and perform the clean room treatment to purify the PM2.5 and other air pollution in the indoor field completely. At the same time, the air pollution in the space of the indoor field is detected by intelligently comparing the ambient air quality status, and the air guiding fan is instantly controlled to adjust the air flow volume according to the air quality, thereby effectively adjusting the energy-saving efficiency of the operation of the gas molecule control hardware device. Moreover, the air flow volume noise reaches zero specification value, thereby achieving the ultimate environmental protection of balanced energy saving and power saving. The AI calculation of the cloud computing service device is used to determine the equivalent of the clean air delivery rate (CADR) required in the space of the indoor field, and then the number of matching arrangements of the gas molecular control hardware device and the optimal clean air delivery rate (CADR) of the air guiding fan of the gas molecular control hardware device can be determined according to the required equivalent of the clean air delivery rate (CADR). Consequently, the instant detection of air pollution purification and the complete clean room treatment are realized, the cleanliness of cleanroom grade is achieved, and the cost effectiveness of clean room treatment towards complete purification is optimized.

[0008] In accordance with an aspect of the present disclosure, an indoor air cleaning system with a networking mechanism is provided, and includes a plurality of gas detectors, a networked cloud computing service device, at least one gas molecule control hardware device and at least one air conditioning device. The plurality of gas detectors are arranged in an

indoor field and an outdoor field to detect air pollution information. The networked cloud computing service device receives the air pollution information of the indoor field and the outdoor field through Internet of Things communication to store and form an air pollution big data database, and intelligently selects and issues a control instruction. The at least one gas molecule control hardware device is arranged in the indoor field, and has at least one of the plurality of gas detectors disposed therein, wherein the gas molecule control hardware device comprises an air guiding fan, a filter component and a driving controller, and the gas detector is electrically connected to the driving controller, and receives the control instruction to the driving controller through the Internet of Things communication to control actuation operation of the air guiding fan, so that air in the indoor field is ventilated and air pollution is guided through the filter component for purification and complete clean room treatment, and the gas detector externally transmits the air pollution information in the indoor field. The at least one air conditioning device is arranged in the indoor field and has at least one of the plurality of gas detectors disposed therein, wherein the air conditioning device includes an air guiding fan, a cooling/heat exchanger and a driving controller, wherein the gas detector is electrically connected to the driving controller and receives the control instruction to the drive controller through the Internet of Things communication to control actuation operation of the air guiding fan, so that the air in the indoor field is guided through the cooling/heat exchanger to adjust a temperature and humidity of the air in the indoor field, and the gas detector externally transmits temperature and humidity information of the air in the indoor field. The networked cloud computing service device receives the air pollution information and the temperature and humidity information of the air, and intelligently selects to issue the control instruction to the air guiding fan of

the gas molecule control hardware device and the air guiding fan of the air conditioning device to enable the actuation operation according to an intelligent calculation comparison of the air pollution big data database, so as to guide the air pollution in the space of the indoor field through the filter component to purify the air pollution to achieve complete clean room treatment. After a required equivalent of the clean air delivery rate (CADR) for the indoor space is determined by the intelligent (AI) calculation comparison of the networked cloud computing service device, a number of the gas molecule control hardware device and an optimal clean air delivery rate (CADR) of the air guiding fan of the gas molecule control hardware equipment are determined according to the required equivalent of the clean air delivery rate (CADR), so as to realize a real-time detection of air pollution purification and the complete clean room treatment, whereby cleanliness reaches a clean room level and a cost-effectiveness of complete clean room treatment is optimized.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1A is a schematic view illustrating an indoor air cleaning system with a networking mechanism implemented in an indoor field according to an embodiment of the present disclosure;

[0010] FIG. 1B is a schematic view illustrating an indoor air cleaning system with a networking mechanism implemented in an indoor field according to another embodiment of the present disclosure;

[0011] FIG. 1C is a schematic view illustrating a purifier of the gas molecule control hardware device according to the embodiment of the present disclosure;

[0012] FIG. 1D is a schematic cross-sectional view illustrating the purifier of the gas molecule control hardware device in FIG. 1A and FIG. 1B of the present invention;

[0013] FIG. 1E is a schematic cross-sectional view illustrating the dehumidifier of the gas molecule control hardware device in FIG. 1A and FIG. 1B of the present disclosure;

[0014] FIG. 1F is a schematic cross-sectional view illustrating the vacuum cleaner of the gas molecule control hardware device in FIG. 1A and FIG. 1B of the present disclosure;

[0015] FIG. 2 is a schematic cross-sectional view illustrating the filter component of the gas molecule control hardware device according to the embodiment of the present disclosure;

[0016] FIG. 3A is a schematic perspective view illustrating the gas detector according to the embodiment of the present disclosure;

[0017] FIG. 3B is a schematic perspective view illustrating the gas detector according to the embodiment of the present disclosure and taken from another perspective;

[0018] FIG. 3C is a schematic perspective view illustrating the gas detection module installed inside the gas detector according to the embodiment of the present disclosure;

[0019] FIG. 4A is a schematic perspective view (1) illustrating the gas detection main part according to the embodiment of the present disclosure;

[0020] FIG. 4B is a schematic perspective view (2) illustrating the gas detection main part according to the embodiment of the present disclosure;

[0021] FIG. 4C is an exploded view illustrating the gas detection device according to the embodiment of the present disclosure;

[0022] FIG. 5A is a schematic perspective view (1) illustrating the base according to the embodiment of the present disclosure;

[0023] FIG. 5B is a schematic perspective view (2) illustrating the base according to the embodiment of the present disclosure;

[0024] FIG. 6 is a schematic view (3) illustrating the base according to the embodiment of the present disclosure;

[0025] FIG. 7A is a schematic exploded view illustrating the combination of the piezoelectric actuator and the base according to the embodiment of the present disclosure;

[0026] FIG. 7B is a schematic perspective view illustrating the combination of the piezoelectric actuator and the base according to the embodiment of the present disclosure;

[0027] FIG. 8A is a schematic exploded view (1) illustrating the piezoelectric actuator according to the embodiment of the present disclosure;

[0028] FIG. 8B is a schematic exploded view (2) illustrating the piezoelectric actuator according to the embodiment of the present disclosure;

[0029] FIG. 9A is a schematic cross-sectional view (1) illustrating an action of the piezoelectric actuator according to the embodiment of the present disclosure;

[0030] FIG. 9B is a schematic cross-sectional view (2) illustrating an action of the piezoelectric actuator according to the embodiment of the present disclosure;

[0031] FIG. 9C is a schematic cross-sectional view (3) illustrating an action of the piezoelectric actuator according to the embodiment of the present disclosure;

[0032] FIG. 10A is a schematic cross-sectional view (1) illustrating the gas detection main part according to the embodiment of the present disclosure;

[0033] FIG. 10B is a schematic cross-sectional view (2) illustrating the gas detection main part according to the embodiment of the present disclosure;

[0034] FIG. 10C is a schematic cross-sectional view (3) illustrating the gas detection main part according to the embodiment of the present disclosure;

[0035] FIG. 11 is a schematic diagram illustrating the communication transmission of the gas detector according to the embodiment of the present invention;

[0036] FIG. 12 is a schematic diagram of the architecture of the networked cloud computing service device according to the embodiment of the present disclosure; and

[0037] FIG. 13 is a table showing the required equivalent of the clean air delivery rate (CADR) at the clean room level of ZAPClean Room 1~12 of the present disclosure.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0038] The present disclosure will now be described more specifically with reference to the following embodiments. It is to be noted that the following descriptions of preferred embodiments of this invention are presented herein for purpose of illustration and description only. It is not intended to be exhaustive or to be limited to the precise form disclosed.

[0039] Please refer to FIG. 1A. The present disclosure provides an indoor air cleaning system with a networking mechanism, which includes a plurality of gas detectors 1, at least one gas molecule control hardware device 2, at least one air conditioning device 3 and a networked cloud computing service device 4.

[0040] In the embodiment, the plurality of gas detectors 1 are arranged in an indoor field A and an outdoor field B to detect air pollution information. The gas detectors 1 also output the air pollution information through Internet of Things (IoT) communication. Notably, in the embodiment, the gas detector 1 includes a gas detection module disposed therein. Please refer to FIG. 3A and FIG. 3B. Preferably but not exclusively, the gas detector 1 is formed by a type of structure including an external power terminal, which can be directly inserted into the power interface in the indoor field A to start the operation of detecting air pollution. In an embodiment, as shown in FIG. 3C, a type of the gas detection module without an external power terminal is directly constructed on the device (e.g., the gas molecule control hardware device 2, the air conditioning device 3) and connected to a driving controller 23. A control instruction is received for the driving controller 23 to control the power supply of the device and control actuation operation of the air guiding fan 21. Notably, in the above embodiments, the indoor field A includes at least one air inlet C1, at least one ventilation port C2 and at least one exhaust port C3.

[0041] In the embodiment, Internet of Things communication refers to a collective network, which connects various devices and technologies and helps the devices communicate with the cloud and with each other. Preferably but not exclusively, the IoT communication is a wired communication, which is connected to the networked cloud computing service device 4 via a wired line. Preferably but not exclusively, the IoT communication is a wireless communication for communicating with the networked cloud computing service device 4 via a wireless connection. The wireless communication transmission includes one selected from the group consisting of a Wi-Fi module, a Bluetooth module, a radio frequency identification module, and a near field communication (NFC) module.

[0042] Notably, in the embodiment, the air pollution is at least one selected from the group consisting of particulate matter, carbon monoxide, carbon dioxide, ozone, sulfur dioxide, nitrogen dioxide, lead, total volatile organic compounds (TVOC), formaldehyde, bacteria, fungi, virus and a combination thereof.

[0043] In the embodiment, the gas molecule control hardware device 2 is disposed in the indoor field A, and at least one gas detector 1 is disposed inside. The gas molecule control hardware device 2 includes an air guiding fan 21, a filter component 22 and a driving controller 23. The gas detector 1 is disposed inside the gas molecule control hardware device 2 and electrically connected to the driving controller 23. The gas detector 1 receives the control instruction to the driving controller 23 through the Internet of Things communication to control actuation operation of the air guiding fan 21, so that air in the indoor field A is ventilated and air pollution is guided through the filter component 22 for purification and complete clean room treatment, and the gas detector 1 externally transmits the air pollution information in the indoor field A.

[0044] In the embodiment, the air conditioning device 3 is arranged in the indoor field A and has at least one gas detector 1 disposed therein. The air conditioning device 3 includes an air guiding fan 31, a cooling/heat exchanger 32 and a driving controller 33. The gas detector 1 is arranged inside the air conditioning device 3 and electrically connected to the driving controller 33. The gas detector 1 receives the control instruction to the driving controller 33 through the Internet of Things communication to control actuation operation of the air guiding fan 31 of the air conditioning device 3, so that the air in the indoor field A is guided through the cooling/heat exchanger 32 to adjust a temperature and humidity of the air in the indoor field A, and the gas detector 1 externally transmits the temperature

and humidity information of the air in the indoor field A. Notably, the temperature and humidity is set at safety values, that is, the temperature and humidity of the indoor field A is maintained at the temperature of $25^{\circ}\text{C}\pm 3^{\circ}\text{C}$ and the humidity of $50\%\pm 10\%$. When the gas detector 1 detects that the temperature and humidity exceed the setting safety values, the control instruction is directly issued to the driving controller 23 to control the actuation operation of the air conditioning device 3, and adjust the indoor field A to maintain a comfortable temperature and humidity in the living environment. In another embodiment, the networked cloud computing service device 4 intelligently calculates and compares the temperature and humidity at the safety values in the indoor field A based on the air pollution big data database. When the temperature and humidity exceed the setting safety values of $25^{\circ}\text{C}\pm 3^{\circ}\text{C}$ and $50\%\pm 10\%$, the networked cloud computing service device 4 intelligently selects to issue the control instruction, and the gas detector 1 receives the control instruction through the Internet of Things communication to the driving controller 23 to control the actuation operation of the air conditioning device 3, and adjusts the indoor field A to maintain a comfortable temperature and humidity in the living environment. Notably, the air conditioning device 3 adjusts the temperature of the indoor field A to maintain the temperature at $25^{\circ}\text{C}\pm 3^{\circ}\text{C}$ and the humidity at $50\%\pm 10\%$.

[0045] In the embodiment, the networked cloud computing service device 4 receives the air pollution information of the indoor field A and the outdoor field B through the Internet of Things communication to store and form an air pollution big data database, and receives the gas temperature and humidity information output by the air conditioning device 3. Moreover, the networked cloud computing service device 4 intelligently calculates and compares according to the air pollution big data database and the gas temperature and humidity information, and intelligently selects to issue the

control instruction to the air guiding fan 21 in the gas molecule control hardware device 2 and the air guiding fan 31 in the air conditioning device 3 to start the control operation. In other words, the air pollution in the space of the indoor field A is detected and intelligently compared with the ambient air quality status, and the air guiding fan 21 is controlled in real time to adjust the guide air volume according to the air quality, so as to effectively adjust the energy-saving efficiency of the operation of the gas molecule control hardware device 2 and the air flow volume noise reaches zero specification value, thereby achieving the ultimate environmental protection of balanced energy saving and power saving.

[0046] In the embodiment, the air guiding fan 21 of the gas molecule control hardware device 2 receives the control instruction from the networked cloud computing service device 4 and is controlled to start, so that the air pollution in the space of the indoor field A is repeatedly drained through the filter component 22 of the gas molecule control hardware device 2 to be purified to achieve the complete clean room treatment. Moreover, a required equivalent of a clean air delivery rate (CADR) in the space of the indoor field A is determined by the intelligent (AI) calculation of the networked cloud computing service device 4. Then, the number of matching arrangements of the gas molecule control hardware device 2 and the optimal clean air delivery rate (CADR) of the air guiding fan 21 of the gas molecule control hardware device 2 can be determined according to the required equivalent of the clean air delivery rate (CADR). Consequently, the instant detection of air pollution purification and the complete clean room treatment are realized, the cleanliness of cleanroom grade is achieved, and the cost effectiveness of clean room treatment towards complete purification is optimized.

[0047] Furthermore, as shown in FIG. 1A, the gas molecule control hardware device 2 includes at least one gas exchange device 2a. The gas exchange device 2a is connected to the air inlet C1 of the indoor field A, and is in communication with the air of the indoor field A. In the embodiment, the networked cloud computing service device 4 intelligently calculates and compares the air pollution information of the indoor field A and the outdoor field B. When the air pollution information detected by the gas detector 1 in the indoor field A is greater than the air pollution information detected by the gas detector 1 in the outdoor field B, the networked cloud computing service device 4 issues the control instruction. The control instruction is transmitted to the gas detector 1 inside the gas exchange device 2a through the Internet of Things communication. The gas detector 1 receives the control instruction to the driving controller 23 to control the actuation operation of air guiding fan 21 of the gas exchange device 2a, so that the air of the outdoor field B is introduced into the indoor field A through the air inlet C1, and then discharged from the exhaust port C3 of the indoor field A for ventilation. Notably, the air pollution information of indoor field A and outdoor field B is the air pollution data of carbon dioxide (CO₂). The purpose of ventilation is to achieve a zero difference of carbon dioxide (CO₂) between the indoor field A and the outdoor field B. The air pollution data of carbon dioxide (CO₂) has an air pollution setting safety value, and the air pollution setting safety value for carbon dioxide (CO₂) is air pollution data below 800PPM. Notably, when the gas detector 1 of the gas exchange device 2a detects that the air pollution of the indoor field A exceeds the air pollution setting safety value, the control instruction is directly issued to the driving controller 23 to control the actuation operation of the air guiding fan 21 in the gas exchange device 2a, so that the air of the outdoor field B is introduced into the indoor field A for ventilation. Notably, when the gas

exchange device 2a enable the actuation operation for ventilation, a positive pressure greater than 0 Pa is maintained in the space of the indoor field A to prevent the air pollution from entering the indoor field A. In an embodiment, the gas exchange device 2a is a fresh air fan, or the gas exchange device 2a is a full heat exchanger. The present disclosure is not limited thereto.

[0048] As shown in FIG. 1A, FIG. 1B, FIG. 1C and FIG. 1D, in an embodiment, the gas molecule control hardware device 2 includes at least one purifier 2b, which is plugged-in to the space of the indoor field A, and the networked cloud computing service device 4 issues the control instruction to the gas detector 1 inside the purifier 2b through the Internet of Things communication. The control instruction is received by the driving controller 23 to control the actuation operation of the air guiding fan 21, so as to guide the air pollution in the space of the indoor field A to be filtered and purified by the filter component 22, and the air purified is then introduced into the space of the indoor field A. Whereby, the air pollution in the space of the indoor field A is guided to pass through the filter component 22 multiple times for air pollution purification and complete clean room treatment.

[0049] As shown in FIG. 1A, in an embodiment, the gas molecule control hardware device 2 includes at least one exhaust device 2d, which is built-in to the indoor field A, corresponds to the exhaust port C3 and is in communication with the outdoor field B. The networked cloud computing service device 4 issues the control instruction to the gas detector 1 inside the exhaust device 2d through the Internet of Things communication. The control instruction is received by the driving controller 23 to control the actuation operation of the air guiding fan 21 to guide the air pollution in the space of the indoor field A to be introduced by the air guiding fan 21 through

the filter component 22 for filtration and purification and discharged to the outdoor field B. Whereby, the air pollution in the space of the indoor field A is purified to achieve the complete clean room treatment.

[0050] As shown in FIG. 1A, in an embodiment, a clean room D is further disposed in the indoor field A. The air conditioning device 3 is in communication with the clean room D to adjust a room temperature and humidity and perform gas ventilation. The air guiding fan 31 inside the air conditioning device 3 introduces the air of the indoor field A, the air purified is introduced into the clean room D. Moreover, the air purified is adjusted to an appropriate temperature and humidity through the cooling/heat exchanger 32. The networked cloud computing service device 4 issues the control instruction. The gas detector 1 receives the control instruction to the driving controller 33 through the Internet of Things communication to control the actuation operation of the air guiding fan 31, so as to adjust the temperature and humidity of the air in the indoor field A. At the same time, the clean room D is in communication with the exhaust port C3, and the exhaust port C3 is embedded in the exhaust device 2d to discharge the air in the clean room D to the outdoor field B for ventilation, so as to form the clean room D for air pollution purification and complete clean room treatment.

[0051] Furthermore, as shown in FIG. 1A and FIG. 1E, in an embodiment, the gas molecule control hardware device 2 includes at least one dehumidifier 2f, which is plugged-in to the space of the indoor field A, and the networked cloud computing service device 4 issues the control instruction to the gas detector 1 inside the dehumidifier 2f through the Internet of Things communication. The control instruction is received by the driving controller 23 to control the actuation operation of the air guiding fan 21. The air pollution in the space of the indoor field A is guided by the

air guiding fan 21 and purified by the filter component 22 for air pollution purification and complete clean room treatment. Moreover, the temperature and humidity of the air in the indoor field A is adjusted. Notably, the dehumidifier 2f sets the temperature and humidity at safety values to maintain the temperature at $25^{\circ}\text{C}\pm 3^{\circ}\text{C}$ and the humidity at $50\%\pm 10\%$.

[0052] As shown in FIG. 1A and FIG. 1F, in an embodiment, the gas molecule control hardware device 2 includes at least one vacuum cleaner 2g, which is plugged-in to in the space of the indoor field A, and the networked cloud computing service device 4 issues the control instruction to the gas detector 1 inside the vacuum cleaner 2g through the Internet of Things communication. The control instruction is received by the driving controller 23 to control the actuation operation of the air guiding fan 21. The air pollution in the space of the indoor field A is guided to the filter component 22 for air pollution purification and complete clean room treatment.

[0053] In another preferred embodiment of the present disclosure, as shown in FIG. 1B, at least one circulating ventilation channel C is disposed in the indoor field A. Preferably but not exclusively, the circulating ventilation channel C is surrounded and isolated by a plurality of partitions and is formed on one side of the indoor field A. The circulating ventilation channel C has at least one air return port C4, and the circulating ventilation channel C is in communication with the air inlet C1, the ventilation port C2, and the exhaust port C3 of the indoor field A.

[0054] As shown in FIG. 1B, in an embodiment, the gas molecule control hardware device 2 includes at least one fan filter unit (FFU) 2c, which is built-in to the circulating ventilation channel C and corresponds to the ventilation port C2 in communication with the air of the indoor field A.

The networked cloud computing service device 4 issues the control instruction to the gas detector 1 inside the fan filter unit (FFU) 2c through the Internet of Things communication. The control instruction is received by the gas detector and transmitted to the driving controller 23 to control the actuation operation of the air guiding fan 21. In that, the air pollution in the space of the indoor field A is guided from the plurality of air return ports C4 into the circulating ventilation channel C to be filtered and purified by the filter component 22 inside the fan filter unit (FFU) 2c. The air purified is then introduced into the space of the indoor field A from the ventilation port, C2, so that the air pollution in the space of the indoor field A is guided to enter the circulating ventilation channel C multiple times for air pollution purification and complete clean room treatment.

[0055] Furthermore, in an embodiment, the gas molecule control hardware device 2 includes at least one exhaust device 2d, which is built-in to the circulating ventilation channel C, corresponds to the air return port C4 and is in communication with the air of the indoor field A. The networked cloud computing service device 4 issues the control instruction to the gas detector 1 inside the exhaust device 2d through the Internet of Things communication. The control instruction is received and transmitted to the driving controller 23 to control the actuation operation of the air guiding fan 21, so that the air pollution in the space of the indoor field A is guided from air return port C4 to pass through the filter component 22 for filtration and purification. The air purified is then introduced into the circulating ventilation channel C for filtration and purification, so that the air pollution in the space of the indoor field A is guided to pass through the filter component 22 in the circulating ventilation channel C multiple times for air pollution purification and complete clean room treatment.

[0056] As shown in FIG. 1B, in the embodiment, a clean room D is further disposed in the indoor field A. The air conditioning device 3 is in communication with the clean room D to adjust a room temperature and humidity and perform gas ventilation. The air guiding fan 31 inside the air conditioning device 3 introduces the air of the indoor field A, the air purified is introduced into the clean room D. The air purified is adjusted to an appropriate temperature and humidity through the cooling/heat exchanger 32. The networked cloud computing service device 4 issues the control instruction to the gas detector 1 inside the air conditioning device 3 through the Internet of Things communication to receive the control instruction to the driving controller to control the actuation operation of the air guiding fan 31, adjust the temperature and humidity of the air in the indoor field A. At the same time, the clean room D is in communication with the air return port C4, and the exhaust device 2d is embedded in the air return port C4 to introduce the air in the clean room D into the circulating ventilation channel C for ventilation in the clean room D, so that the clean room D for air pollution purification and complete clean room treatment is achieved. Notably, the cooling/heat exchanger 32 of the air conditioning device 3 sets the temperature and humidity at safe values to maintain the temperature at $25^{\circ}\text{C}\pm 3^{\circ}\text{C}$ and the humidity at $50\%\pm 10\%$.

[0057] As shown in FIG. 1B and FIG. 1E, in an embodiment, the gas molecule control hardware device 2 includes at least one dehumidifier 2f, which is plugged-in to the space of the indoor field A, and the networked cloud computing service device 4 issues the control instruction to the gas detector 1 inside the dehumidifier 2f through the Internet of Things communication. The control instruction is received by the driving controller 23 to control the actuation operation of the air guiding fan 21. The air pollution in the space of the indoor field A is guided by the air guiding

fan 21 and purified by the filter component 22 for air pollution purification and complete clean room treatment. Moreover, the temperature and humidity of the air in the indoor field A is adjusted. Notably, the dehumidifier 2f set the temperature and humidity safety values to maintain the temperature at $25^{\circ}\text{C}\pm 3^{\circ}\text{C}$ and the humidity at $50\%\pm 10\%$.

[0058] As shown in FIG. 1B and FIG. 1F, in an embodiment, the gas molecule control hardware device 2 includes at least one vacuum cleaner 2g, which is plugged-in to the space of the indoor field A, and the networked cloud computing service device 4 issues the control instruction to the gas detector 1 inside the vacuum cleaner 2g through the Internet of Things communication. The control instruction is received by the driving controller 23 to control the actuation operation of the air guiding fan 21. The air pollution in the space of the indoor field A is guided to the filter component 22 for air pollution purification and complete clean room treatment.

[0059] As shown in FIG. 1A and FIG. 1B, when cooking food in the kitchen environment of indoor field A, serious air pollution is generated relatively quickly. In order to prevent the air pollution generated in indoor field A from affecting human health and causing harm, the gas molecule control hardware device 2 of the indoor air cleaning system is set and served as an extractor hood system 2e, which is arranged in the kitchen of indoor field A. The extractor hood system 2e includes an exhaust channel 2ea, which is arranged above a cooking appliance H and in communication with the outdoor field B. The exhaust channel 2ea is provided with an air guiding fan 21, a filter component 22 and a driving controller 23, and the gas detector 1 is arranged in the exhaust channel 2ea and electrically connected to the driving controller 23. The gas detector 1 receives the control instruction to the driving controller 23 through the Internet of Things

communication to control the actuation operation of the air guiding fan 21. Moreover, the extractor hood system 2e includes an oil fume exhaust body 2eb, which is arranged in front of the cooking appliance H and in communication with the outdoor field B. The oil fume exhaust body 2eb is provided with an air guiding fan 21, a filter component 22 and a driving controller 23, and a gas detector 1 is arranged in the oil fume exhaust body 2eb and electrically connected to the driving controller 23. The control instruction is received by the gas detector 1 to the driving controller 23 through the Internet of Things communication to control the actuation operation of the air guiding fan 21. The networked cloud computing service device 4 issues the control instruction to the gas detector 1 inside the exhaust channel 2ea and the gas detector 1 inside the oil fume exhaust body 2eb of the extractor hood system 2e through the Internet of Things communication. The control instruction is transmitted to the driving controller 23 to control the actuation operation of the air guiding fan 21. The air pollution in the kitchen of the indoor field A flows into the exhaust channel 2ea and the oil fume exhaust body 3eb and passes through the filter component 22 therein for filtering and purification, and then introduced into the outdoor field B, so that the kitchen for air pollution purification and complete clean room treatment is achieved.

[0060] Certainly, the actuation operation of the air guiding fan 21 of the gas molecule control hardware device 2 can be controlled by the gas detector 1 arranged in the indoor field A and the gas detector 1 inside the gas molecule control hardware device 2 to connect to the networked cloud computing service device 4, and each of the gas detectors 1 monitors the air quality in the space of the indoor field A anytime and anywhere. Moreover, at the same time, the air pollution information in the space of the indoor field A is transmitted to the air pollution big data database of the networked cloud

computing service device 4 to intelligently compare the ambient air quality status, and instantly control the air guiding fan 21 arranged in each area to adjust the air volume according to the air quality. The energy-saving benefits of the operation of the gas molecule control hardware device 2 are effectively controlled, and the required equivalent of the clean air delivery rate (CADR) in the space of the indoor field A is determined by intelligent (AI) calculation of the networked cloud computing service device 4. Then, the number of matching arrangements of the gas molecule control hardware device 2 and the optimal clean air delivery rate (CADR) of the air guiding fan 21 of the gas molecule control hardware device 2 can be determined according to the required equivalent of the clean air delivery rate (CADR), so as to realize real-time detection of air pollution purification and complete clean room treatment, achieve the cleanliness of the clean room level and optimize the cost setting benefits of purification and complete clean room treatment.

[0061] Furthermore, as shown in FIG. 13, the required cleanliness of the indoor field of the present disclosure needs to meet a clean room level of ZAPClean Room 1~12. Therefore, after the indoor air pollution prevention and control system uses the big data database intelligence (AI) to determine the required equivalent of the clean air delivery rate (CADR) for the space of the indoor field A, the number of matching arrangements of the gas molecule control hardware device 2 and the optimal clean air delivery (CADR) of the air guiding fan 21 can be determined according to the required equivalent of the clean air delivery rate (CADR), and the air quality in the space of the indoor field A can be monitored anytime and anywhere. At the same time, the air pollution in the space of the indoor field is detected and intelligently compared with the ambient air quality status, and the air guiding fan 21 is controlled in real time to adjust the guiding air volume

according to the air quality, so as to effectively control the energy-saving benefits of the operation of the purification device, achieve the cleanliness of the clean room level and optimize the cost setting benefits of the purification and complete clean room treatment. Notably, the required equivalent of clean air delivery rate (CADR) refers to the clean air delivery rate (CADR) of the air guiding fan 21 required in the space of the indoor field A in this area at that time, which can achieve the demand of completely cleaning the air pollution.

[0062] The following is an example of a preferred embodiment of the clean air delivery rate (CADR) required in the space of the indoor space A of the present disclosure:

[0063] In the indoor air pollution control system, as long as the area location of the indoor space is inputted, the required clean air delivery volume (CADR) in the space of indoor space A can be obtained. If the area location of the indoor space is in Taipei, what is the required clean air delivery volume (CADR) required for the cleanliness level of ZAPClean Room 9 in the 3 square meters of the indoor space?

[0064] The big data database of the air pollution prevention system can be used for intelligent calculation and analysis according to the equivalent comparison table of the required clean air delivery rate (CADR) per cubic meter as the clean room levels of ZAPClean Room1~12 in FIG. 13. The required equivalent of the clean air delivery rate (CADR) per cubic meter for the clean room levels of ZAPClean Room 1~12 of the present disclosure is as follows:

[0065] The required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 1 is ranged from 195000 m³/h to 370000 m³/h, the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 2

is ranged from 58000 m³/h to 115000 m³/h, the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 3 is ranged from 17500 m³/h 35000 m³/h, the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 4 is ranged from 5200 m³/h 10000 m³/h, the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 5 is ranged from 1500 m³/h to 3000 m³/h, the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 6 is ranged from 450 m³/h to 1000 m³/h, the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 7 is ranged from 135 m³/h to 300 m³/h, the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 8 is ranged from 60 m³/h to 135 m³/h, the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 9 is ranged from 35 m³/h to 80 m³/h, the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 10 is ranged from 15 m³/h to 40 m³/h, the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 11 is ranged from 10 m³/h to 30 m³/h, and the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 12 is ranged from 3 m³/h to 10 m³/h.

[0066] When the area location of the indoor field A in Taipei and the required space volume are inputted, the air pollution big data database of the networked cloud computing service device 4 can be used to intelligently calculate and determine the required clean air delivery rate (CADR) for performing air pollution purification and complete clean room treatment. It

is calculated that the maximum value of PM_{2.5} in Taipei over the past five years is 37, and the average value is 11.9. At this time, the average value of 11.9 falls in the average value comparison table of average zone 10~15, and the maximum value is 37/average value 11.9, which is equal to 3.1, which falls in the ratio zone 3~4 of the average zone 10~15 in comparison table. Furthermore, the required cleanliness is at the level of ZAPClean Room 9. Therefore, the required equivalent of the clean air delivery per cubic meter (CADR) for the cleanliness level of ZAPClean Room 9 in this indoor field is 56.26 m³/h. In case of that the required space of the indoor field is 30 ping (268 m³), it is multiplied by 56.26 m³/h, so the required clean air delivery rate (CADR) for this required indoor field is 15078 m³/h. Therefore, the required equivalent of the clean air delivery rate (CADR) of the gas molecule control hardware device 2 for performing air pollution purification and complete clean room treatment is 15000 m³/h. In an embodiment, the gas molecule control hardware device 2 of the present disclosure is configured to combine the three gas exchange devices 2a with the optimal clean air delivery rate (CADR) set at 1000 m³/h, and fifteen air guiding fans 21 of the fan filter units (FFU) 2c with the optimal clean air delivery rate (CADR) at 800 m³/h, so as to achieve the required equivalent of clean air delivery rate (CADR) of the gas molecule control hardware device 2 at 15000 m³/h for performing air pollution purification and complete clean room treatment, but not limited to thereto. Certainly, the required equivalent of the clean air delivery rate (CADR) for the indoor field A can be utilized to determine the number of matching arrangements of the gas molecule control hardware equipment 2 and the optimal clean air delivery rate (CADR) of the air guiding fan 21 of the gas molecule control hardware device 2, so as to realize real-time detection of air pollution purification and complete clean room processing, achieve the cleanliness of

the clean room level and optimize the cost-effectiveness of purification and complete clean room treatment.

[0067] In the present disclosure, the specific implementation of the indoor air cleaning system with the networking mechanism is understandable, and the structure of the gas detection module of the gas detector 1 of the present disclosure is described in detail below. Please refer to FIG. 3A to FIG. 11. In the embodiment, the gas detection module includes a controlling circuit board 11, a gas detection main part 12, a microprocessor 13 and a communicator 14. The gas detection main part 12, the microprocessor 13 and the communicator 14 are integrally packaged on the controlling circuit board 11 and electrically connected to each other. In the embodiment, the microprocessor 13 and the communicator 14 are mounted on the controlling circuit board 11. The microprocessor 13 controls the driving signal of the gas detection main part 12 for enabling the detection. In this way, the gas detection main part 12 detects the air pollution and outputs the air pollution information, and the microprocessor 13 receives, processes and provides the air pollution information to the communicator 14 for a communication transmission externally, and transmitting to the cloud computing server device 4 through IoT (Internet of Things) communication.

[0068] Please refer to FIG. 4A to FIG. 9A. In the embodiment, the gas detection main part 12 includes a base 121, a piezoelectric actuator 122, a driving circuit board 123, a laser component 124, a particulate sensor 125, and an outer cover 126. In the embodiment, the base 121 includes a first surface 1211, a second surface 1212, a laser loading region 1213, a gas-inlet groove 1214, a gas-guiding-component loading region 1215 and a gas-outlet groove 1216. The first surface 1211 and the second surface 1212 are two surfaces opposite to each other. In the embodiment, the laser loading region 1213 is hollowed out from the first surface 1211 toward the second surface

1212. The outer cover 126 covers the base 121 and includes a side plate 1261. The side plate 1261 has an inlet opening 1261a and an outlet opening 1261b. The gas-inlet groove 1214 is concavely formed from the second surface 1212 and disposed adjacent to the laser loading region 1213. The gas-inlet groove 1214 includes a gas-inlet 1214a and two lateral walls. The gas-inlet 1214a is in communication with an environment outside the base 121, and is spatially corresponding in position to an inlet opening 1261a of the outer cover 126. Two transparent windows 1214b are opened on the two lateral walls of the gas-inlet groove 1214 and are in communication with the laser loading region 1213. Therefore, the first surface 1211 of the base 121 is covered and attached by the outer cover 126, and the second surface 1212 is covered and attached by the driving circuit board 123, so that an inlet path is defined by the gas-inlet groove 1214. In the embodiment, the gas-guiding-component loading region 1215 mentioned above is concavely formed from the second surface 1212 and in communication with the gas-inlet groove 1214. A ventilation hole 1215a penetrates a bottom surface of the gas-guiding-component loading region 1215. The gas-guiding-component loading region 1215 includes four positioning protrusions 1215b disposed at four corners of the gas-guiding-component loading region 1215, respectively. In the embodiment, the gas-outlet groove 1216 includes a gas-outlet 1216a, and the gas-outlet 1216a is spatially corresponding to the outlet opening 1261b of the outer cover 126. The gas-outlet groove 1216 includes a first section 1216b and a second section 1216c. The first section 1216b is concavely formed out from the first surface 1211 in a region spatially corresponding to a vertical projection area of the gas-guiding-component loading region 1215. The second section 1216c is hollowed out from the first surface 1211 to the second surface 1212 in a region where the first surface 1211 is extended from the vertical projection area of the gas-

guiding-component loading region 1215. The first section 1216b and the second section 1216c are connected to form a stepped structure. Moreover, the first section 1216b of the gas-outlet groove 1216 is in communication with the ventilation hole 1215a of the gas-guiding-component loading region 1215, and the second section 1216c of the gas-outlet groove 1216 is in communication with the gas-outlet 1216a. In that, when first surface 1211 of the base 121 is attached and covered by the outer cover 126 and the second surface 1212 of the base 121 is attached and covered by the driving circuit board 123, the gas-outlet groove 1216 and the driving circuit board 123 collaboratively define an outlet path.

[0069] In the embodiment, the laser component 124 and the particulate sensor 125 are disposed on and electrically connected to the driving circuit board 123 and located within the base 121. In order to clearly describe and illustrate the positions of the laser component 124 and the particulate sensor 125 in the base 121, the driving circuit board 123 is intentionally omitted. The laser component 124 is accommodated in the laser loading region 1213 of the base 121, and the particulate sensor 125 is accommodated in the gas-inlet groove 1214 of the base 121 and is aligned to the laser component 124. In addition, the laser component 124 is spatially corresponding to the transparent window 1214b, therefore, a light beam emitted by the laser component 124 passes through the transparent window 1214b and is irradiated into the gas-inlet groove 1214. A light beam path emitted from the laser component 124 passes through the transparent window 1214b and extends in an orthogonal direction perpendicular to the gas-inlet groove 1214. In the embodiment, a projecting light beam emitted from the laser component 124 passes through the transparent window 1214b and enters the gas-inlet groove 1214 to irradiate the suspended particles contained in the gas passing through the gas-inlet groove 1214. When the suspended particles contained

in the gas are irradiated and generate scattered light spots, the scattered light spots are received and calculated by the particulate sensor 125 to obtain the gas detection information.

[0070] In the embodiment, the piezoelectric actuator 122 is accommodated in the square-shaped gas-guiding-component loading region 1215 of the base 121. In addition, the gas-guiding-component loading region 1215 of the base 121 is in fluid communication with the gas-inlet groove 1214. When the piezoelectric actuator 122 is enabled, the gas in the gas-inlet groove 1214 is inhaled by the piezoelectric actuator 122, so that the gas flows into the piezoelectric actuator 122, and is transported into the gas-outlet groove 1216 through the ventilation hole 1215a of the gas-guiding-component loading region 1215. Moreover, the driving circuit board 123 covers the second surface 1212 of the base 121, and the laser component 124 is disposed on the driving circuit board 123, and is electrically connected to the driving circuit board 123. The particulate sensor 125 is also disposed on the driving circuit board 123 and electrically connected to the driving circuit board 123. In that, when the outer cover 126 covers the base 121, the inlet opening 1261a is spatially corresponding to the gas-inlet 1214a of the base 121, and the outlet opening 1261b is spatially corresponding to the gas-outlet 1216a of the base 121.

[0071] In the embodiment, the piezoelectric actuator 122 includes a gas-injection plate 1221, a chamber frame 1222, an actuator element 1223, an insulation frame 1224 and a conductive frame 1225. In the embodiment, the gas-injection plate 1221 is made by a flexible material and includes a suspension plate 1221a and a hollow aperture 1221b. The suspension plate 1221a is a sheet structure and is permitted to undergo a bending deformation. Preferably but not exclusively, the shape and the size of the suspension plate 1221a are accommodated in the inner edge of the gas-guiding-component

loading region 1215, but not limited thereto. The hollow aperture 1221b passes through a center of the suspension plate 1221a, so as to allow the gas to flow therethrough. Preferably but not exclusively, in the embodiment, the shape of the suspension plate 1221a is selected from the group consisting of a square, a circle, an ellipse, a triangle and a polygon, but not limited thereto.

[0072] In the embodiment, the chamber frame 1222 is carried and stacked on the gas-injection plate 1221. In addition, the shape of the chamber frame 1222 is corresponding to the gas-injection plate 1221. The actuator element 1223 is carried and stacked on the chamber frame 1222. A resonance chamber 1226 is collaboratively defined by the actuator element 1223, the chamber frame 1222 and the suspension plate 1221a and is formed between the actuator element 1223, the chamber frame 1222 and the suspension plate 1221a. The insulation frame 1224 is carried and stacked on the actuator element 1223 and the appearance of the insulation frame 1224 is similar to that of the chamber frame 1222. The conductive frame 1225 is carried and stacked on the insulation frame 1224, and the appearance of the conductive frame 1225 is similar to that of the insulation frame 1224. In addition, the conductive frame 1225 includes a conducting pin 1225a and a conducting electrode 1225b. The conducting pin 1225a is extended outwardly from an outer edge of the conductive frame 1225, and the conducting electrode 1225b is extended inwardly from an inner edge of the conductive frame 1225. Moreover, the actuator element 1223 further includes a piezoelectric carrying plate 1223a, an adjusting resonance plate 1223b and a piezoelectric plate 1223c. The piezoelectric carrying plate 1223a is carried and stacked on the chamber frame 1222. The adjusting resonance plate 1223b is carried and stacked on the piezoelectric carrying plate 1223a. The piezoelectric plate 1223c is carried and stacked on the

adjusting resonance plate 1223b. The adjusting resonance plate 1223b and the piezoelectric plate 1223c are accommodated in the insulation frame 1224. The conducting electrode 1225b of the conductive frame 1225 is electrically connected to the piezoelectric plate 1223c. In the embodiment, the piezoelectric carrying plate 1223a and the adjusting resonance plate 1223b are made by a conductive material. The piezoelectric carrying plate 1223a includes a piezoelectric pin 1223d. The piezoelectric pin 1223d and the conducting pin 1225a are electrically connected to a driving circuit (not shown) of the driving circuit board 123, so as to receive a driving signal, such as a driving frequency and a driving voltage. Through this structure, a circuit is formed by the piezoelectric pin 1223d, the piezoelectric carrying plate 1223a, the adjusting resonance plate 1223b, the piezoelectric plate 1223c, the conducting electrode 1225b, the conductive frame 1225 and the conducting pin 1225a for transmitting the driving signal. Moreover, the insulation frame 1224 is insulated between the conductive frame 1225 and the actuator element 1223, so as to avoid the occurrence of a short circuit. Thereby, the driving signal is transmitted to the piezoelectric plate 1223c. After receiving the driving signal such as the driving frequency and the driving voltage, the piezoelectric plate 1223c deforms due to the piezoelectric effect, and the piezoelectric carrying plate 1223a and the adjusting resonance plate 1223b are further driven to generate the bending deformation in the reciprocating manner.

[0073] Furthermore, in the embodiment, the adjusting resonance plate 1223b is located between the piezoelectric plate 1223c and the piezoelectric carrying plate 1223a and served as a cushion between the piezoelectric plate 1223c and the piezoelectric carrying plate 1223a. Thereby, the vibration frequency of the piezoelectric carrying plate 1223a is adjustable. Basically, the thickness of the adjusting resonance plate 1223b is greater than the

thickness of the piezoelectric carrying plate 1223a, and the vibration frequency of the actuator element 1223 can be adjusted by adjusting the thickness of the adjusting resonance plate 1223b.

[0074] Please further refer to FIG. 7A, FIG. 7B, FIG.8A, FIG. 8B and FIG. 9A. In the embodiment, the gas-injection plate 1221, the chamber frame 1222, the actuator element 1223, the insulation frame 1224 and the conductive frame 1225 are stacked and positioned in the gas-guiding-component loading region 1215 sequentially, so that the piezoelectric actuator 122 is supported and positioned in the gas-guiding-component loading region 1215. A plurality of clearances 1221c are defined between the suspension plate 1221a of the gas-injection plate 1221 and an inner edge of the gas-guiding-component loading region 1215 for gas flowing therethrough. In the embodiment, a flowing chamber 1227 is formed between the gas-injection plate 1221 and the bottom surface of the gas-guiding-component loading region 1215. The flowing chamber 1227 is in communication with the resonance chamber 1226 between the actuator element 1223, the chamber frame 1222 and the suspension plate 1221a through the hollow aperture 1221b of the gas-injection plate 1221. By controlling the vibration frequency of the gas in the resonance chamber 1226 to be close to the vibration frequency of the suspension plate 1221a, the Helmholtz resonance effect is generated between the resonance chamber 1226 and the suspension plate 1221a, so as to improve the efficiency of gas transportation. When the piezoelectric plate 1223c is moved away from the bottom surface of the gas-guiding-component loading region 1215, the suspension plate 1221a of the gas-injection plate 1221 is driven to move away from the bottom surface of the gas-guiding-component loading region 1215 by the piezoelectric plate 1223c. In that, the volume of the flowing chamber 1227 is expanded rapidly, the internal pressure of the flowing

chamber 1227 is decreased to form a negative pressure, and the gas outside the piezoelectric actuator 122 is inhaled through the clearances 1221c and enters the resonance chamber 1226 through the hollow aperture 1221b. Consequently, the pressure in the resonance chamber 1226 is increased to generate a pressure gradient. When the suspension plate 1221a of the gas-injection plate 1221 is driven by the piezoelectric plate 1223c to move toward the bottom surface of the gas-guiding-component loading region 1215, the gas in the resonance chamber 1226 is discharged out rapidly through the hollow aperture 1221b, and the gas in the flowing chamber 1227 is compressed, thereby the converged gas is quickly and massively ejected out of the flowing chamber 1227 under the condition close to an ideal gas state of the Benulli's law, and transported to the ventilation hole 1215a of the gas-guiding-component loading region 1215.

[0075] By repeating the above operation steps shown in FIG. 9B and FIG. 9C, the piezoelectric plate 1223c is driven to generate the bending deformation in a reciprocating manner. According to the principle of inertia, since the gas pressure inside the resonance chamber 1226 is lower than the equilibrium gas pressure after the converged gas is ejected out, the gas is introduced into the resonance chamber 1226 again. Moreover, the vibration frequency of the gas in the resonance chamber 1226 is controlled to be close to the vibration frequency of the piezoelectric plate 1223c, so as to generate the Helmholtz resonance effect to achieve the gas transportation at high speed and in large quantities. The gas is inhaled through the gas-inlet 1214a on the outer cover 126, flows into the gas-inlet groove 1214 of the base 121 through the gas-inlet 1214a, and is transported to the position of the particulate sensor 125. The piezoelectric actuator 122 is enabled continuously to inhale the gas into the inlet path, and facilitate the gas outside the gas detection module to be introduced rapidly, flow stably, and

transported above the particulate sensor 125. At this time, a projecting light beam emitted from the laser component 124 passes through the transparent window 1214b to irritate the suspended particles contained in the gas flowing above the particulate sensor 125 in the gas-inlet groove 1214. When the suspended particles contained in the gas are irradiated and generate scattered light spots, the scattered light spots are received and calculated by the particulate sensor 125 for obtaining related information about the sizes and the concentration of the suspended particles contained in the gas. Moreover, the gas above the particulate sensor 125 is continuously driven and transported by the piezoelectric actuator 122, flows into the ventilation hole 1215a of the gas-guiding-component loading region 1215, and is transported to the gas-outlet groove 1216. At last, after the gas flows into the gas outlet groove 1216, the gas is continuously transported into the gas-outlet groove 1216 by the piezoelectric actuator 122, and thus the gas in the gas-outlet groove 1216 is pushed to discharge through the gas-outlet 1216a and the outlet opening 1261b.

[0076] The gas detector 1 of the present disclosure not only can detect the particulate matters in the gas, but also can detect the gas characteristics of the introduced gas, for example, to determine whether the gas is formaldehyde, ammonia, carbon monoxide, carbon dioxide, oxygen, ozone, or the like. Therefore, in one or some embodiments, the gas detector 1 of the present disclosure further includes a gas sensor 127 positioned and disposed on the driving circuit board 123, electrically connected to the driving circuit board 123, and accommodated in the gas-outlet groove 1216, so as to detect the air pollution introduced into the gas-outlet groove 1216. Preferably but not exclusively, in an embodiment, the gas sensor 127 includes a volatile-organic-compound sensor for detecting the information of carbon dioxide (CO₂) or volatile organic compounds (TVOC).

Preferably but not exclusively, in an embodiment, the gas sensor 127 includes a formaldehyde sensor for detecting the information of formaldehyde (HCHO) gas. Preferably but not exclusively, in an embodiment, the gas sensor 127 includes a bacteria sensor for detecting the information of bacteria or fungi. Preferably but not exclusively, in an embodiment, the gas sensor 127 includes a virus sensor for detecting the information of virus in the gas. Preferably but not exclusively, the gas sensor 127 is a temperature and humidity sensor for detecting the temperature and humidity information of the gas.

[0077] Please refer to FIG. 2. In the embodiment, the air guiding fan 21 of the gas molecule control hardware device 2 is controlled to start and guide the air pollution to pass through the filter component 22 for filtration. Preferably but not exclusively, the filter component 22 is a filter with a grade of minimum filtration efficiency value (MREV) 8 or above, or a filter with high-efficiency particulate air (HEPA) grade, which is configured to absorb the chemical smoke, the bacteria, the dust particles and the pollen contained in the air pollution, so that the air pollution introduced into the filter component 22 is filtered and purified to achieve the effect of filtering and purification. Notably, in the present disclosure, the filter with the high efficiency particulate air (HEPA) grade is of 10 or above, and has a dust holding capacity greater than 12,000 mg. In an embodiment, the filter component 22 of the present disclosure is further combined with physical or chemical materials to provide a sterilization effect on the air pollution, and the airflow of the air guiding fan 21 flows in the path indicated by the arrow. In an embodiment, the filter component 22 includes a decomposition layer coated thereon to sterilize in chemical means. Preferably but not exclusively, the decomposition layer includes an activated carbon 22a configured to remove organic and inorganic substances in air pollution, and

remove colored and odorous substances. Preferably but not exclusively, the activated carbon has a formaldehyde absorption capacity greater than 1,500 mg. In an embodiment, the decomposition layer includes a cleansing factor containing chlorine dioxide layer 22b configured to inhibit viruses, bacteria, fungi, influenza A, influenza B, enterovirus and norovirus in the air pollution, and the inhibition ratio can reach 99% and more, thereby reducing the cross-infection of viruses. In an embodiment, the decomposition layer includes an herbal protective layer 22c extracted from ginkgo and Japanese Rhus chinensis configured to resist allergy effectively and destroy a surface protein of influenza virus (such as H1N1 influenza virus) passing therethrough. In an embodiment, the decomposition layer includes a silver ion 22d configured to inhibit viruses, bacteria and fungi contained in the air pollution. In an embodiment, the decomposition layer includes a zeolite 23e configured to remove ammonia nitrogen, heavy metals, organic pollutants, Escherichia coli, phenol, chloroform and anionic surfactants. Furthermore, in some embodiments, the filter component 22 is combined with a light irradiation element to sterilize in chemical means. Preferably but not exclusively, the light irradiation element is a photo-catalyst unit including a photo catalyst 22f and an ultraviolet lamp 22g. When the photo catalyst 22f is irradiated by the ultraviolet lamp 22g, the light energy is converted into the chemical energy, thereby decomposes harmful gases and disinfects bacteria contained in the air pollution, so as to achieve the effects of filtering and purifying. Notably, the power of the ultraviolet lamp 22g in the present disclosure is more than 120 mw. In an embodiment, the light irradiation element is a photo-plasma unit including a nanometer irradiation tube 22h. When the introduced air pollution is irradiated by the nanometer irradiation tube 22h, the oxygen molecules and water molecules contained in the air pollution are decomposed into high oxidizing photo-plasma, and an

ion flow capable of destroying organic molecules is generated. In that, volatile formaldehyde, volatile toluene and volatile organic compounds (VOC) contained in the air pollution are decomposed into water and carbon dioxide, so as to achieve the effects of filtering and purifying. Moreover, in some embodiments, the filter component 22 is combined with a decomposition unit to sterilize in chemical means. Preferably but not exclusively, the decomposition unit is a negative ion unit 22i with a dust collecting plate. It makes the suspended particles in the air pollution to carry with positive charge and adhered to the dust collecting plate carry with negative charges, so as to achieve the effects of filtering and purifying. Preferably but not exclusively, the decomposition unit is a plasma ion unit 22j. The oxygen molecules and water molecules contained in the air pollution are decomposed into positive hydrogen ions (H^+) and negative oxygen ions (O^{2-}) by the plasma ion. The substances attached with water around the ions are adhered on the surface of viruses and bacteria and converted into OH radicals with extremely strong oxidizing power, thereby removing hydrogen (H) from the protein on the surface of viruses and bacteria, and thus decomposing (oxidizing) the protein, so as to filter the introduced air pollution and achieve the effects of filtering and purifying.

[0078] Please refer to FIG. 12. In the embodiment, the cloud computing server device 4 includes a wireless network cloud computing service module 41, a cloud control service unit 42, a device management unit 43 and an application program unit 44. The wireless network cloud computing service module 41 receives the air pollution information of the outdoor field B, receives the air pollution information of the indoor field A, receives the communication information of the devices (such as the gas molecule control hardware equipment 2 and the air conditioning device 3) and transmits the control commands. Moreover, the wireless network

cloud computing service module 41 receives the air pollution information of the indoor field A and the outdoor field B and transmits it to the cloud control service unit 42 to store and form an air pollution big data database. An artificial intelligence calculation is implemented to determine the location of the air pollution through the air pollution database comparison, so that the control command is transmitted to the wireless network cloud computing service module 41, and then transmitted to the devices (such as the gas molecule control hardware equipment 2 and the air conditioning device 3) to control the actuation operation through the wireless network cloud computing service module 41. The device management unit 43 receives the communication information of the devices through the wireless network cloud computing service module 41 to manage the user login and device binding. The device management information can be provided to the application program unit 44 for system control and management, and the application program unit 44 can also display and inform the air pollution information obtained by the cloud control service unit 42. The user can know the real-time status of air pollution removal through the mobile phone or the communication device. Moreover, the user can control the operation of the indoor air cleaning system through the application program unit 44 of the mobile phone or the communication device.

[0079] In summary, the present disclosure provides an indoor air cleaning system with a networking mechanism for implementing air pollution detection and complete purification in the space of an indoor field. A plurality of gas detectors, at least one gas molecule control hardware device, at least one air conditioning device, and an Internet-connected cloud computing service device are disposed in an indoor space. The gas detectors are arranged in the indoor field and the outdoor field. Moreover, each of gas molecule control hardware device and each of air conditioning

device is equipped with the gas detector that is connected to the cloud to form an intelligent linkage system. Real-time linkage control is implemented to control actuation of air guiding fan in the gas molecule control hardware device and the air conditioning device, the air quality of space in the indoor field is monitored anytime and anywhere, and the air conditioning device is used to control the temperature and humidity in the indoor field. The indoor air cleaning system with the networking mechanism is established in this way to obtain the room temperature in the indoor field, achieve zero difference of carbon dioxide (CO₂) in the indoor field and the outdoor field, and perform the clean room treatment to purify the PM2.5 and other air pollution in the indoor field completely. At the same time, the air pollution in the space of the indoor field is detected by intelligently comparing the ambient air quality status, and the air guiding fan is instantly controlled to adjust the air flow volume according to the air quality, thereby effectively adjusting the energy-saving efficiency of the operation of the gas molecule control hardware device. Moreover, the air flow volume noise reaches zero specification value, thereby achieving the ultimate environmental protection of balanced energy saving and power saving. The AI calculation of the cloud computing service device is used to determine the equivalent of the clean air delivery rate (CADR) required in the space of the indoor field, and then the number of matching arrangements of the gas molecular control hardware device and the optimal clean air delivery rate (CADR) of the air guiding fan of the gas molecular control hardware device can be determined according to the required equivalent of the clean air delivery rate (CADR). Consequently, the instant detection of air pollution purification and the complete clean room treatment are realized, the cleanliness of cleanroom grade is achieved, and the cost effectiveness of

clean room treatment towards complete purification is optimized. The present disclosure includes the industrial applicability and the inventive steps.

WHAT IS CLAIMED IS:

1. An indoor air cleaning system with a networking mechanism, comprising:
a plurality of gas detectors arranged in an indoor field and an outdoor field to detect air pollution information;

a networked cloud computing service device receiving the air pollution information of the indoor field and the outdoor field through Internet of Things communication to store and form an air pollution big data database, and intelligently selecting and issuing a control instruction;

at least one gas molecule control hardware device arranged in the indoor field, and having at least one of the plurality of gas detectors disposed therein, wherein the gas molecule control hardware device comprises an air guiding fan, a filter component and a driving controller, and the gas detector is electrically connected to the driving controller, and receives the control instruction to the driving controller through the Internet of Things communication to control actuation operation of the air guiding fan, so that air in the indoor field is ventilated and air pollution is guided through the filter component for purification and complete clean room treatment, and the gas detector externally transmits the air pollution information in the indoor field; and

at least one air conditioning device arranged in the indoor field and having at least one of the plurality of gas detectors disposed therein, wherein the air conditioning device comprises an air guiding fan, a cooling/heat exchanger and a driving controller, wherein the gas detector is electrically connected to the driving controller and receives the control instruction to the drive controller through the Internet of Things communication to control actuation operation of the air guiding fan, so that the air in the indoor field is guided through the cooling/heat exchanger to adjust a temperature and humidity of the air in the indoor field, and the gas detector externally transmits

temperature and humidity information of the air in the indoor field;

wherein the networked cloud computing service device receives the air pollution information and the temperature and humidity information of the air, and intelligently selects to issue the control instruction to the air guiding fan of the gas molecule control hardware device and the air guiding fan of the air conditioning device to enable the actuation operation according to an intelligent calculation comparison of the air pollution big data database, so as to guide the air pollution in the space of the indoor field through the filter component to purify the air pollution to achieve complete clean room treatment;

wherein after a required equivalent of the clean air delivery rate (CADR) for the indoor space is determined by the intelligent (AI) calculation comparison of the networked cloud computing service device, a number of the gas molecule control hardware device and an optimal clean air delivery rate (CADR) of the air guiding fan of the gas molecule control hardware equipment are determined according to the required equivalent of the clean air delivery rate (CADR), so as to realize a real-time detection of air pollution purification and the complete clean room treatment, whereby cleanliness reaches a clean room level and a cost-effectiveness of complete clean room treatment is optimized.

2. The indoor air cleaning system with the networking mechanism according to claim 1, wherein at least one air inlet, at least one ventilation port and at least one exhaust port are disposed in the indoor field, wherein the gas molecule control hardware device comprises at least one gas exchange device, which corresponds to the air inlet of the indoor field and in communication with the air of the indoor field, wherein the networked cloud computing service device intelligently calculates and compares the air pollution information of the indoor field and the outdoor field, wherein when

the air pollution information of the indoor field is higher than the air pollution information of the outdoor field, the networked cloud computing service device issues the control instruction to the gas detector inside the gas exchange device through the Internet of Things communication to receive the control instruction for the driving controller controlling the actuation operation of the gas exchange device, whereby air of the outdoor field is introduced into the indoor field through the air inlet, and then the air of the indoor field is exhausted through the exhaust port for ventilation.

3. The indoor air cleaning system with the networking mechanism according to claim 2, wherein when the gas detector of the gas exchange device detects that the air pollution information of the indoor field exceeds an air pollution setting safety value, the control instruction is directly issued to the driving controller to control the actuation operation of the gas exchange device, so that the air of the outdoor field is introduced into the indoor field for ventilation.

4. The indoor air cleaning system with the networking mechanism according to claim 3, wherein the air pollution information of the indoor field and the outdoor field is air pollution data of carbon dioxide (CO_2), and ventilation is performed to achieve a zero difference of carbon dioxide (CO_2) between the indoor field and the outdoor field.

5. The indoor air cleaning system with the networking mechanism according to claim 2, wherein when the gas exchange device is enable the actuation operation for ventilation, a positive pressure greater than 0 Pa is maintained in the space of the indoor field to prevent air pollution in the outdoor field from entering the indoor field, wherein the gas exchange device is a fresh air fan or a full heat exchanger.

6. The indoor air cleaning system with the networking mechanism according to claim 1, wherein the gas molecule control hardware device comprises at

least one purifier, which is plugged-in to the space of the indoor field, and the networked cloud computing service device issues the control instruction to the gas detector inside the purifier through the Internet of Things communication, wherein the control instruction is received by the driving controller to control the actuation operation of the air guiding fan, so as to guide the air pollution in the space of the indoor field to be filtered and purified by the filter component, and the air purified is then introduced into the space of the indoor field, whereby the air pollution in the space of the indoor field is guided to pass through the filter component multiple times for air pollution purification and complete clean room treatment.

7. The indoor air cleaning system with the networking mechanism according to claim 2, wherein the gas molecule control hardware device comprises at least one exhaust device, which is built-in to the indoor field, corresponds to the exhaust port and is in communication with the outdoor field, wherein the networked cloud computing service device issues the control instruction to the gas detector inside the exhaust device through the Internet of Things communication, wherein the control instruction is received by the driving controller to control the actuation operation of the air guiding fan to guide the air pollution in the space of the indoor field to be introduced by the air guiding fan through the filter component for filtration and purification and discharged to the outdoor field, whereby the air pollution in the space of the indoor field is purified to achieve the complete clean room treatment.

8. The indoor air cleaning system with the networking mechanism according to claim 7, further comprising a clean room disposed in the indoor field, wherein the air conditioning device is in communication with the clean room to adjust a room temperature and humidity and perform gas ventilation, the air guiding fan inside the air conditioning device introduces the air of the indoor field, and the air purified is introduced into the clean room, wherein

the air purified is adjusted to an appropriate temperature and humidity through the cooling/heat exchanger, and the networked cloud computing service device issues the control instruction to the gas detector inside the air conditioning device through the Internet of Things communication to receive the control instruction to the driving controller to control the actuation operation of the air guiding fan, so as to adjust the temperature and humidity of the air in the indoor field, wherein the clean room is in communication with the exhaust port, and the exhaust port is embedded in the exhaust device to discharge the air in the clean room to the outdoor field for ventilation, so as to form the clean room for air pollution purification and complete clean room treatment, wherein the cooling/heat exchanger of the air conditioning device sets the temperature and humidity at safety values to maintain the temperature at $25^{\circ}\text{C}\pm 3^{\circ}\text{C}$ and the humidity at $50\%\pm 10\%$.

9. The indoor air cleaning system with the networking mechanism according to claim 1, wherein the gas molecule control hardware device comprises at least one dehumidifier, which is plugged-in to the space of the indoor field, and the cloud computing service device issues the control instruction to the gas detector inside the dehumidifier through the Internet of Things communication, wherein the control instruction is received by the driving controller to control the actuation operation of the air guiding fan, the air pollution in the space of the indoor field is guided by the air guiding fan and purified by the filter component for air pollution purification and complete clean room treatment, and the temperature and humidity of the air in the indoor field is adjusted, wherein the dehumidifier sets the temperature and humidity at safety values to maintain the temperature at $25^{\circ}\text{C}\pm 3^{\circ}\text{C}$ and the humidity at $50\%\pm 10\%$.

10. The indoor air cleaning system with the networking mechanism according to claim 1, wherein the gas molecule control hardware device

comprises at least one vacuum cleaner, which is plugged-in to the space of the indoor field, and the networked cloud computing service device issues the control instruction to the gas detector inside the vacuum cleaner through the Internet of Things communication, and the control instruction is received by the driving controller to control the actuation operation of the air guiding fan, wherein the air pollution in the space of the indoor field is guided to the filter component for air pollution purification and complete clean room treatment.

11. The indoor air cleaning system with the networking mechanism according to claim 2, further comprising at least one circulating ventilation channel disposed in the indoor field, wherein the at least one circulating ventilation channel is surrounded and isolated by a plurality of partitions and formed on one side of the indoor field, the circulating ventilation channel has at least one air return port, and the circulating ventilation channel is in communication with the air inlet, the ventilation port and the exhaust port in the indoor field.

12. The indoor air cleaning system with the networking mechanism according to claim 11, wherein the gas molecule control hardware device comprises at least one fan filter unit (FFU), which is built-in to the circulating ventilation channel and corresponds to the ventilation port in communication with the air of the indoor field, wherein the networked cloud computing service device issues the control instruction to the gas detector inside the fan filter unit (FFU) through the Internet of Things communication, the control instruction is received by the gas detector and transmitted to the driving controller to control the actuation operation of the air guiding fan, and the air pollution in the space of the indoor field is guided from the plurality of air return ports into the circulating ventilation channel to filtered and purified by the filter component inside the fan filter unit (FFU), wherein the air

purified is then introduced into the space of the indoor field from the ventilation port, so that the air pollution in the space of the indoor field is guided to enter the circulating ventilation channel multiple times for air pollution purification and complete clean room treatment.

13. The indoor air cleaning system with the networking mechanism according to claim 12, wherein the gas molecule control hardware device comprises at least one exhaust device, which is built-in to the circulating ventilation channel, corresponds to the air return port, and is in communication with the air of the indoor field, wherein the networked cloud computing service device issues the control instruction to the gas detector inside the exhaust device through the Internet of Things communication, wherein the control instruction is received by the gas detector and transmitted to the driving controller to control the actuation operation of the air guiding fan, so that the air pollution in the space of the indoor field is guided from the air return port to pass through the filter component for filtration and purification, wherein the air purified is then introduced into the circulating ventilation channel for filtration and purification, so that the air pollution in the space of the indoor field is guided to pass through the filter component in the circulating ventilation channel multiple times for air pollution purification and complete clean room treatment.

14. The indoor air cleaning system with the networking mechanism according to claim 13, further comprising a clean room, wherein the air conditioning device is in communication with the clean room to adjust a room temperature and humidity and perform gas ventilation, the air guiding fan inside the air conditioning device introduces the air of the indoor field, and the air purified is introduced into the clean room, wherein the air purified is adjusted to an appropriate temperature and humidity through the cooling/heat exchanger, and the networked cloud computing service device

issues the control instruction to the gas detector inside the air conditioning device through the Internet of Things communication to receive the control instruction to the driving controller to control the actuation operation of the air guiding fan, adjust the temperature and humidity of the air in the indoor field, wherein the clean room is in communication with the air return port, and the exhaust device is embedded in the air return port to introduce the air in the clean room into the circulating ventilation channel for ventilation in the clean room, so that the clean room for air pollution purification and complete clean room treatment is achieved, wherein the cooling/heat exchanger of the air conditioning device sets the temperature and humidity at safety values to maintain the temperature at $25^{\circ}\text{C}\pm 3^{\circ}\text{C}$ and the humidity at $50\%\pm 10\%$.

15. The indoor air cleaning system with the networking mechanism according to claim 1, wherein the gas molecule control hardware device comprises an extractor hood system, which is arranged in a kitchen of the indoor space, wherein the extractor hood system comprises an exhaust channel, which is arranged above a cooking appliance and in communication with the outdoor field, wherein the air guiding fan, the filter component and the driving controller are arranged in the exhaust channel, and the gas detector arranged in the exhaust channel and electrically connected to the driving controller receives the control instruction to the driving controller through the Internet of Things communication to control the actuation operation of the air guiding fan, wherein the extractor hood system comprises an oil fume exhaust body, which is arranged in front of the cooking appliance and in communication with the outdoor field, wherein the air guiding fan, the filter component and the driving controller are arranged in the fume exhaust body, and the gas detector is arranged in the oil fume exhaust body and electrically connected to the driving controller, and the control

instruction is received by the gas detector to the driving controller through the Internet of Things communication to control the actuation operation of the air guiding fan, wherein the networked cloud computing service device issues the control instruction to the gas detector inside the exhaust channel and the gas detector inside the oil fume exhaust body of the extractor hood system through the Internet of Things communication, wherein the control instruction is transmitted to the driving controller to control the actuation operation of the air guiding fan, and the air pollution in the kitchen of the indoor field flows into the exhaust channel and the oil fume exhaust body and passes through the filter component for filtering and purification, and then introduced into the outdoor field, so that the kitchen for air pollution purification and complete clean room treatment is achieved.

16. The indoor air cleaning system with the networking mechanism according to claim 1, wherein Internet of Things communication is a wireless communication for communicating with the networked cloud computing service device via a wireless connection, or a wired communication for communicating with the networked cloud computing service device via a wired line, wherein the wireless communication transmission comprises one selected from the group consisting of a Wi-Fi module, a Bluetooth module, a radio frequency identification module and a near field communication (NFC) module.

17. The indoor air cleaning system with the networking mechanism according to claim 1, wherein the gas detector comprises a controlling circuit board, a gas detection main part, a microprocessor and a communicator, the controlling circuit board is electrically connected to the driving control element, and the gas detection main part, the microprocessor and the communicator are integrally packaged on the controlling circuit board and electrically connected to the controlling circuit board, wherein the

microprocessor controls the detection of the gas detection main part, the gas detection main part detects the air pollution, and the microprocessor processes the air pollution to output and provide the air pollution information to the communicator for a communication transmission externally.

18. The indoor air cleaning system with the networking mechanism according to claim 1, wherein the filter component is a filter with a minimum efficiency reporting value (MREV) of 8 or above, or the filter component is a filter with a high efficiency particulate air (HEPA) grade, wherein the filter with the high efficiency particulate air (HEPA) grade is of 10 or above, and has a dust holding capacity greater than 12,000 mg, wherein the filter component is combined with a decomposition layer a decomposition layer coated thereon, and the decomposition layer uses chemical means to sterilize the air pollution, wherein comprises at least one selected from the group consisting of an activated carbon, a cleansing factor containing chlorine dioxide layer, an herbal protective layer extracted from ginkgo and Japanese rhus chinensis, a silver ion, a zeolite and a combination thereof, wherein the activated carbon has a formaldehyde absorption capacity greater than 1,500 mg.

19. The indoor air cleaning system with the networking mechanism according to claim 1, wherein the networked cloud computing service device comprises a wireless network cloud computing service module, a cloud control service unit, a device management unit and an application program unit.

20. The indoor air cleaning system with the networking mechanism according to claim 1, wherein the clean room level is ZAPClean Room 1~12, wherein the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 1 is ranged from 195000 m³/h to 370000 m³/h, the required equivalent of the clean air delivery

rate (CADR) per cubic meter at the clean room level of ZAPClean Room 2 is ranged from 58000 m³/h to 115000 m³/h, the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 3 is ranged from 17500 m³/h to 35000 m³/h, the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 4 is ranged from 5200 m³/h to 10000 m³/h, the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 5 is ranged from 1500 m³/h to 3000 m³/h, the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 6 is ranged from 450 m³/h to 1000 m³/h, the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 7 is ranged from 135 m³/h to 300 m³/h, the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 8 is ranged from 60 m³/h to 135 m³/h, the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 9 is ranged from 35 m³/h to 80 m³/h, the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 10 is ranged from 15 m³/h to 40 m³/h, the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 11 is ranged from 10 m³/h to 30 m³/h, and the required equivalent of the clean air delivery rate (CADR) per cubic meter at the clean room level of ZAPClean Room 12 is ranged from 3 m³/h to 10 m³/h.