discharged from engines and other internal combustion engines.

[Citation List]
[Non Patent Literature]
[0006]
[NPL 1] Complete NOx Removal Technology Using Nonequilibrium Plasma and Chemical Process (Performances of Ordinary and Barrier Type Plasma Reactors), Transactions of the Japan Society of Mechanical Engineers, Vol. 66, No. 646B, pp. 1501-1506 (2000)

[Summary of Invention]
[Technical Problem]
[0007]
However, conventional air purification systems serving as plasma reactors have a problem that sufficient power is not supplied to the electrodes due to impedance mismatching of the signal of the applied pulse voltage. In addition, with high-voltage pulses of several kilohertz, the time between high-voltage pulses is longer than the electric discharge time caused by high-voltage pulses. At this time, electrons once ionized from gas recombine, and thus a large amount of energy needs to be supplied for electron ionization every time high-voltage pulses are applied. As a result, the apparatus has a low power efficiency. Therefore, even if plasma is generated, the amount of bacteria, viruses, etc. in the air decomposed by plasma is low relative to the input power.
[0008]
In addition, it is difficult for conventional air purification systems to reduce: dissociation of nitrogen molecules which is, along with dissociation of oxygen molecules, induced by an intense electric field corresponding to a pulse apex value; and nitrogen oxides generated by the dissociation of nitrogen molecules. It is also difficult with the conventional technology to enable generation of ozone while preventing generation of nitrogen oxides.
[0009]
In view of this, in order to address the issues described above, embodiments of the present disclosure provide an air purification system and protective clothing capable of decomposing bacteria,

viruses etc. in the air by efficiently generating plasma while reducing input power as compared to the conventional technology.

[Solution to Problem]
[0010]

According to a first aspect of the present disclosure, there is provided an air purification system that generates plasma using voltage, the air purification system including: a first electrode that generates electromagnetic resonance when power is supplied; a second electrode disposed surrounding the first electrode in a state of being separated from the first electrode; a power feeder that supplies power to the first electrode; an electric field probe that measures an intensity of an electric field between the first electrode and the second electrode; and a controller that controls the power supplied to the first electrode, wherein the controller performs control by adjusting a frequency of the power supplied to the first electrode and a position at which the power is supplied to the first electrode, to cause a half wavelength during electromagnetic resonance of the first electrode to be a sum of a length of the second electrode and a length of plasma generated, and maximize an output value of a signal indicating the intensity of the electric field measured by the electric field probe.
[0011]

The air purification system further incorporates therein a detector that monitors the amounts of ozone and nitrogen oxides generated. With the amounts of ozone and nitrogen oxides generated set as targets to be controlled, the air purification system changes alternating current (AC) power, the frequency, and the power feeding point to be able to control the electric field applied to plasma so that an energy at which oxygen molecules are dissociated by plasma and ozone is thereby generated but nitrogen molecules are not dissociated and generation of nitrogen oxides is thereby minimized is inputted to gas molecules.
[0012]

According to a second aspect of the present disclosure, there is provided protective clothing including: the above air purification system; and a covering body that is provided with the air purification system and covers a surface of a body of a person, wherein the air

purification system purifies air taken in from outside and supplies purified air into the covering body.

[0013]

Note that these general or specific aspects may be implemented by a system, a method, an integrated circuit, a computer program, or a computer-readable recording medium such as CD-ROM, or by any combination thereof.

[Advantageous Effects of Invention]

[0014]

According to embodiments of the present disclosure, it is possible to decompose bacteria, viruses etc. in the air by efficiently generating plasma while reducing input power as compared to the conventional technology.

[Brief Description of Drawings]

[0015]

[FIG. 1]

FIG. 1 is a schematic diagram illustrating an air purification system according to Embodiment 1.

[FIG. 2]

FIG. 2 is a schematic diagram schematically illustrating, for example, the flow of air taken into the air purification system according to Embodiment 1 and changes of a power feeding point at which a power feeder supplies power to a linear electrode.

[FIG. 3]

FIG. 3 is a schematic diagram illustrating changes of the length of a resonator included in the air purification system according to Embodiment 1.

[FIG. 4]

FIG. 4 is a schematic diagram illustrating how viruses are decomposed in a plasma generation region of the air purification system according to Embodiment 1.

[FIG. 5]

FIG. 5 is a schematic diagram schematically illustrating, for example, the flow of air taken into an air purification system according to a variation of Embodiment 1 and changes of a power