CLAIMS

[Claim 1]

An apparatus that monitors abnormalities in a system including a plurality of components or products,

wherein the plurality of components or products respectively include a plurality of types of capsules that release, due to specific causes, a plurality of marker chemical substances respectively, the plurality of marker chemical substances having respectively different ion mobilities, and

the apparatus comprises an ion mobility sensor that detects the plurality of marker chemical substances.

[Claim 2]

The apparatus according to claim 1,

wherein the plurality of types of capsules respectively have a predetermined resistance to pressure, resistance to heat, weather resistance, light resistance, or chemical resistance.

[Claim 3]

Particles that generate signals with maker chemical substances for use by an ion mobility sensor, comprising:

one of a plurality of marker chemical substances with different ion mobilities: and

one of a plurality of types of capsules that encapsulate the one of the plurality of marker chemical substances and release, due to specific causes, the one of the plurality of marker chemical substances.

[Claim 4]

The particles according to claim 3,

wherein the plurality of types of capsules respectively have a predetermined resistance to pressure, resistance to heat, light resistance, weather resistance, or chemical resistance.

[Claim 5]

A semifinished product such as a paint, a resin or a member, including the particles according to claim 3 or claim 4.

[Claim 6]

A monitoring system comprising:

a component or product to be monitored including the particles according to claim 3 or claim 4; and

an ion mobility sensor that detects the plurality of marker chemical substances.

[Claim 7]

A control method of an apparatus that monitors a system including a plurality of components or products for abnormalities,

wherein the plurality of components or products respectively include a plurality of types of capsules that release, due to specific causes, a plurality of marker chemical substances respectively, the plurality of marker chemical substances having respectively different ion mobilities, and the apparatus includes an ion mobility sensor that detects the plurality of marker chemical substances,

and the control method comprises determining, when the ion mobility sensor detects a marker chemical substance out of the plurality of marker chemical substances, a component, product, or cause related to the marker chemical substance detected out of the plurality of components, products and causes.

CLAIMS

1. An apparatus that monitors abnormalities in a system including a plurality of components or products disposed in an enclosed or semi-enclosed space,

wherein the plurality of components or products respectively include a plurality types of capsules that release, due to predetermined specific causes to be monitored, a plurality of marker chemical substances respectively, each of the plurality of marker chemical substances having a respectively different spectrum,

the apparatus comprises:

a sensor that detects spectrums of the plurality of marker chemical substances released from the plurality of components or products to the space by sampling air in the space,

a database that includes information of a relationship of registered spectrums, the plurality of marker chemical substances, the plurality of components or products, and the predetermined specific cases to be monitored; and

a unit that determines abnormal states of the plurality of components or products based on a spectrum detected by the sensor and the registered spectrums in the database.

2. The apparatus according to claim 1,

wherein the plurality of type of capsules respectively have a predetermined resistance to pressure, resistance to heat, weather resistance, light resistance, or chemical resistance.

3. A control method of an apparatus that monitors a system including a plurality of components or products disposed in an enclosed or semi-enclosed space for abnormalities,

wherein the plurality of components or products respectively include a plurality of types of capsules that release, due to predetermined specific causes to be monitored, a plurality of marker chemical substances respectively, each of the plurality of marker chemical substances having a respectively different spectrum, and the apparatus comprises:

a sensor that detects spectrums of the plurality of marker chemical substances released from the plurality of components or product to the space by sampling air in the space; and

a database that includes information of a relationship of registered spectrums, the plurality of marker chemical substances, the plurality of components or product and the predetermined specific causes to be monitored, and

the control method comprises determining abnormal states of the plurality of components or products based on a spectrum detected by the sensor and the registered spectrums in the database.

4. A monitoring system comprising:

the apparatus according to claim 1; and

a plurality of components or products disposed in the enclosed or semi-enclosed space, the air in the space being sampled by the apparatus and the plurality of components or products respectively include the plurality types of capsules that release, due to predetermined specific causes to be monitored, the plurality of marker chemical substances respectively, the plurality of marker chemical substances having respectively different spectrums.

5. The monitoring system according to claim 4, wherein the plurality of components or products include a paint, a resin or a member that includes at least one of the plurality types of capsules.

6. A component or a product described in claim 1 or 2.

7. A semi-finished product such as a paint, a resin or a member that includes at least one of the plurality types of capsules described in claim 1 or 2.

8. A particle that includes at least one of the plurality types of capsules described in claim 1 or 2.