Indoor Electrostatic Air Filter Using Carbon Fiber Ionization Process

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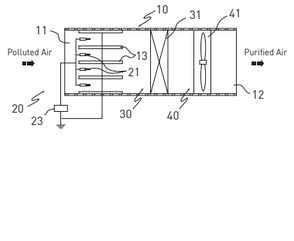
Air filter that uses micro carbon fiber discharge electrodes to electrically charge fine particles without generating ozone and collect fine particles with strong electrostatic force



Client / Market

- Air purifier company, active ventilation system for public facility including subway station/parking lot/airport, dust collection facility manufacturer, environmental facility field

Necessity of this Technology

- Existing electric air purifiers havethe ozone generation issue that it is not favorable toa closed indoor environment, and the mechanical filter type air purifiers have issues with the filter replacement management and the required power increase due to filter pressure drop increase as dusts are collected on the filter.
- The technology for dust collection is now going for a hybrid type that uses two or more principles, and existing method needs supplementation in its core technology to improve its performance.
- Existing filter type air purifier needs periodical filter replacements, and due to poor maintenance performed by the user, secondary pollutants may arise from filter contaminations. Electric precipitator has the benefit of low pressure loss, but it requires high voltage to improve its fine particle collection efficiency. During strong corona discharges, the ozone level may exceed the recommended level for indoor environment, which limits its use.

Technical Differentiation

- Filter management is possible without replacements. The pressure loss is low and the energy efficiency is outstanding. Without generating harmful substance like ozone, it has great fine particle collection performance.
- The generation of any harmful substance such as ozone can be suppressed to below few ppbs because the electric dust collecting method of very low pressure loss is used and the micro carbon fiber discharge electrode of 5 to 10 μm in diameteris applied that electric discharge can be done uniformly with a low applied voltage. This technique is environmentally friendly because it does not require filter replacements which results filter waste. And the cost of filter replacement can be reduced.
- Fine particles can be collected with the electrical method with low pressure loss and no ozone generation. With the dielectric coated collection plate, high insulating property can be maintained that stable operation is possible under humid circumstances and with washing processes

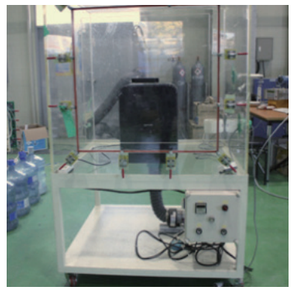
DESIRED PARTNERSHIP

Technology Transfer | Licensing | Joint Research | Other

TECHNOLOGY READINESS LEVEL [TRL]

Research, basic explanation | Project concept or idea development | Technology idea verification | Prototype development | Trial product production/ evaluation in similar environment | Pilot field demonstration | Development and optimization of commercial model | Commercial product demonstration | Mass production and initial market launch

Photo of Air Purifier



- With ozone generation below few ppbs, the level is lower than the eco–friendly certified standard (10 ppb). It can be maintained simply with water replacement without using a filter. Ina viewpoint of energy consumption, this technique is outstanding because of low pressure drop.

Excellence of Technology

- A relatively low voltage is applied to the microcarbon fiber bundle to electrically charge the fine particles with high efficiency without generating ozone. And an electrostatic filter with a high–strength electricfield, metal collection plate or dielectric material–coated collection plate collects the electrically charged particles. The ozone generation level is approximately 1 to 2 ppb, which is significantly lower than the local indoor environment standard level of 50 ppb. By applying voltage of 7 to 10 kV in the charger and over 10 kV in the collector, the technology can improve the dust collection efficiency for fine particles of size 0.3 μm to 95% or higher.

Current Intellectual Property Right Status

PATENT

- Aerosol Particle Charger Using Carbon Fiber (KR0849674)
- Electric Dust Collector Using Carbon Fiber Woven Fabrics (KR1064488)
- Air Purifier Using Carbon Fiber (KR0937944)
- Air Purifier Using Carbon Fiber Woven Fabrics (KR1032612)
- An Air Cleaning Device of Electric Dust Collection Type (KR1112441)
- Electric Dust Collector Using Carbon Fiber Woven Fabrics (KR1064487)
- Air Purifier Using Carbon Fiber Woven Fabrics (KR1064486)
- The Hydrophile Property of Precipitation Plates (KR1178766)
- Electrostatic Precipitator with Easily Replaceable Collection Plate (KR1331611)
- An Electrostatic Precipitator Using Carbon Fibers Equipped with Edge–Coated Collection Plates (KR1453499)
- Electric Dust Collecting Air Cleaning Device with Ion Generator in Outlet (KR0859840)
- Apparatus for Treating Harmful Gas (KR1190604)
- Aerosol Electric Charge Equipment Using Carbon Fiber Woven Fabrics (KR1048416)
- Electric Precipitator Using Activated Carbon Fiber Filter (KR1373720)
- Electric Precipitator Using Activated Carbon Fiber Filter (KR1087055)
- Solution Containing the Catalyst Particles Mist Recovery Device and Method (KR1334263)
- Electrostatic Precipitator and System Using the Same (KR1221962)