Portable Device and System for $PM_{2.5}$ Real-time Monitoring

University of Waterloo

Reference

8810-7364

Sectors

Environment Air monitoring

Consumer Healthcare Devices

Clean technology

Patent Status

U.S. Provisional patent application filed

Contact

Ling Loerchner

Waterloo Commercialization Office (WatCo)

519-888-4567 x38428

LLoerchn@uwaterloo.ca

a member of C4 a technology transfer community

Description of the Invention

$PM_{2.5}$ is the mass of solid or liquid droplets in the air with diameters less than 2.5 micrometers. They can enter human respiratory system and cause heart diseases and lung cancers.

$PM_{2.5}$ is a key indicator of the level of air pollution. Existing offline $PM_{2.5}$ monitoring is gravimetric and takes hours to days to complete one sample. It is time consuming and it cannot detect the air quality in a real time. Commercially available online-$PM_{2.5}$ monitoring devices have been developed to address this issue, but they aim mainly at air quality monitoring stations, and they are costly.

University of Waterloo researchers have developed a portable device and system that can be used for real time $PM_{2.5}$ measurement. The system employs a $PM_{2.5}$ sampler to collect $PM_{2.5}$ samples from total particulate matter (PM) in front of a device that can detect these particles. $PM_{2.5}$ is then calculated based on a simplified algorithm. It can report $PM_{2.5}$ at a time interval as short as a few seconds.

This portable $PM_{2.5}$ monitor can be used in air quality monitoring any point of interests. A few examples include monitoring air quality in a personal car, house, office or a community; air quality researchers for mobile air monitoring, instant $PM_{2.5}$ monitoring for people with respiratory symptoms like asthma to avoid unnecessary exposure. In addition, a variety of high-end devices can be developed from similar fundamental principles aiming at scientific research and laboratory usages.

Advantages

- Small in size and portable
- Low cost
- Real time measurement and display

Potential applications

- Consumer products for instant $PM_{2.5}$ monitoring
- Air quality study
- Mobile PM2.5 measurement for research engine emissions
- Monitoring air quality in indoor environment like a car, airport, office and house.
- Field measurement of a source emissions

Development status

- Proof-of-principle studies completed.
- Seeking industrial partner for product development
- Studies for additional markets are on-going.