

A Wireless Sensor System for Continuous Monitoring of Particulate Air Pollution

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Abstract : The aim of this work is to design, develop and test the low-cost implementation of a particulate air pollution sensor system for continuous monitoring of outdoors and indoors particulate air pollution at a lower cost than existing instruments. In this study, measuring electrostatic charge of particles technique via high efficiency particulate-free air filter was carried out. The developed detector consists of a PM10 impactor, a particle charger, a Faraday cup electrometer, a flow meter and controller, a vacuum pump, a DC high voltage power supply and a data processing and control unit. It was reported that the developed detector was capable of measuring mass concentration of particulate ranging from 0 to 500 $\mu\text{g}/\text{m}^3$ corresponding to number concentration of particulate ranging from 106 to 1012 particles/ m^3 with measurement time less than 1 sec. The measurement data of the sensor connects to the internet through a GSM connection to a public cellular network. In this development, the apparatus was applied the energy by a 12 V, 7 A internal battery for continuous measurement of about 20 hours. Finally, the developed apparatus was found to be close agreement with the import standard instrument, portable and benefit for air pollution and particulate matter measurements.

Keywords : particulate, air pollution, wireless communication, sensor

Conference Title : ICCSIE 2015 : International Conference on Computer Science and Information Engineering

Conference Location : Tokyo, Japan

Conference Dates : May 28-29, 2015