

Air Pollution Monitoring Using Nanotechnology Based Solid State Gas Sensors And GIS Modeling

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Abstract:

Air pollution is a serious problem in thickly populated and industrialized areas in Thailand, especially in Bangkok. The air pollution in Bangkok is abundant, especially in areas where pollution sources and the human population are concentrated. Economic growth and industrialization are proceeding at a rapid pace, accompanied by increasing emissions of air polluting sources. Furthermore, though the variety and quantities of polluting sources have increased dramatically, the development of a suitable method for monitoring the pollution causing sources has not followed at the same pace. To prevent or minimize the damage caused by atmospheric pollution, suitable monitoring systems are urgently needed that can rapidly and reliably detect and quantify polluting sources for monitoring by regulating authorities in order to prevent further deterioration of the current pollution levels. Consequently, it is important that the current real-time air quality monitoring system, controlled by the Pollution Control Department (PCD), should be adapted or extended to aid in alleviating this problem.

So as to carry out air pollution monitoring over an extensive area, a combination of ground measurements through inexpensive sensors and wireless GIS is employed for this purpose. This portable device, comprising solid state metal oxide gas sensors integrated to a Personal Digital Assistant (PDA) linked through Bluetooth communication tools and Global Positioning System (GPS), will allow rapid dissemination of information on pollution levels at multiple sites simultaneously. The air quality report generated can be then published using Internet GIS to provide a real-time information service for the PCD, for increased public awareness and enhanced public participation. The testing of this new sensor technology will be discussed in detail as well as a summary of the advantages and disadvantages of using this portable device will be concluded in the paper.