

Title 2: Monitoring of environmental and water quality in Madhya Pradesh

Brief: Water, an essential substance for human survival is already getting scarce in many regions of the world. While, 1.1 billion of world population lives without clean drinking water, 2.6 billion people lack adequate sanitation (2002, UNICEF/WHO JMP 2004). In a developing nation like India, potable drinking water is growing scanty every day. With level of contaminants in the natural water bodies on the rise, the issue of water scarcity will worsen. The problem associated with hazardous contaminations in water bodies is that they get generally detected only when the health of a larger population in a region starts getting effected. The present day contamination detection techniques are reliant on lab based chemical tests or bulky field-testing equipment. Though test of salinity of water is available in a hand held device, hazardous element detection in water bodies still awaits a simple portable device for rapid detection of contaminants. Two-dimensional electron gas (2DEG) based heterostructures have the resolution and sensing capability. This is due to the different electronegativity of every element, which will affect the polarity of epilayer of heterostructures and eventually will result in change in current that can be electrically quantified and calibrated. Fluoride being high on electronegativity is expected to give significant detection signal in the so-formed sensing technique.

Air pollution is another serious and worldwide problem, which affects the human health. Air pollution in Madhya Pradesh is mainly caused by automobiles, rapid urbanization, and industrialization and by other resources. The adverse effects of air pollution have been associated with three major sources: Carbon monoxide (CO) and photochemical oxidants from motor vehicles; sulphur dioxide and solid particulates from fossil fuels and miscellaneous pollutants such as hydrogen sulphide, lead and cadmium emitted by smelters, refineries, manufacturing plants and vehicles. Novel, cost-effective, and flexible gas sensor will be developed in this phase with higher selectivity, sensitivity, and lifetime.

Keyword: Pollution sensor, water quality monitoring, higher selectivity and sensitivity, cost-effective and flexible