

## HYBRID MOLECULE NANOCRYSTAL ASSEMBLIES FOR PHOTONIC AND ELECTRONIC SENSING APPLICATIONS

The HYSENS project develops hybrid smart materials for the detection of ions in water and biological fluids. New materials capable of detecting biologically or environmentally important ions at low sensitivity and high selectivity have been developed. The use of intelligent nanomaterials provides cheap and portable alternatives to currently used cumbersome analytical tools.

For example, ultrapure water is an essential reagent for the manufacture of semiconductor, pharmaceutical and power plant industries. Existing and future industries are required to detect contaminant levels down to nanogram/L concentration limits. These limits can today only be met with the incorporation of water analysis systems prohibitively expensive to implement.

On the other hand in the clinical diagnostic area there is an increasing demand for development of innovative low cost analysis technologies that could be applied for example in emergency rooms in analysis of body fluids to obtain fast indication for the diagnosis of specific diseases.

The unique consortium of academic and industry physicists, chemists and technologists has developed novel hybrid materials. Such materials have been incorporated into devices and sensor modalities of highly sensitivity and selectivity have been fabricated.

### PROJECT HIGHLIGHTS

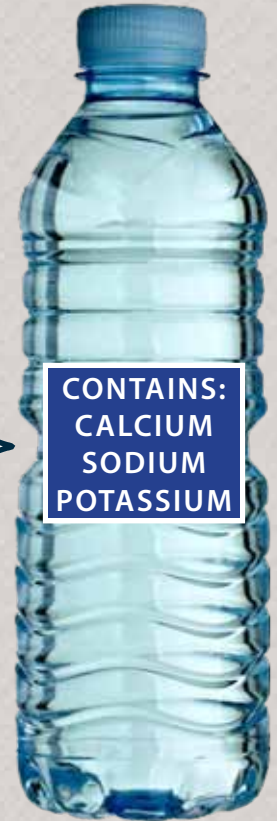
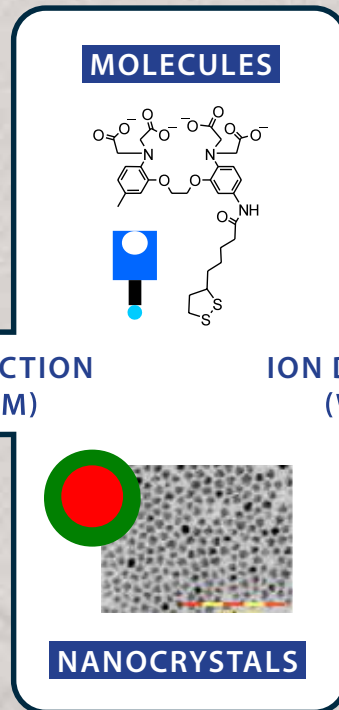
- 1. Four classes of hybrid structures constituted by synthesised building blocks were assembled and characterised.**
- 2. Light-based sensors have been developed for the detection of environmentally damaging and toxic metals such as mercury, copper and lead in water.**
- 3. Electronic sensors have been assembled for the detection of sodium and potassium in water and blood serum.**
- 4. Electrochemical sensors for detection of potassium in water were developed.**
- 5. Devices based on miniaturized optical sensors for optical read out have been developed for proof-of-concept detection of sodium and copper.**
- 6. The technologies have been incorporated into microfluidic devices.**
- 7. New materials and methods have been developed of wide potential in nanotechnology and sensor applications.**

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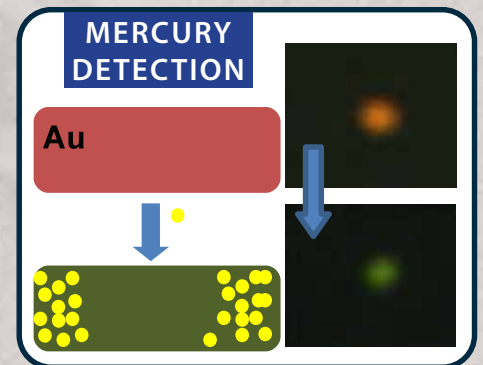
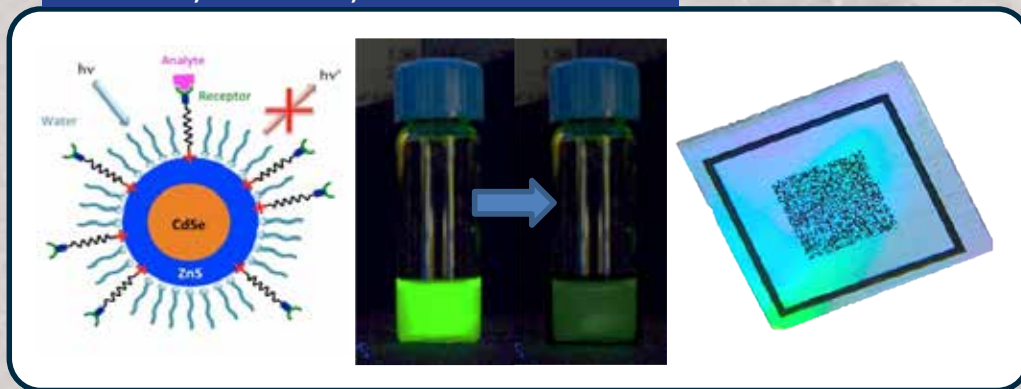
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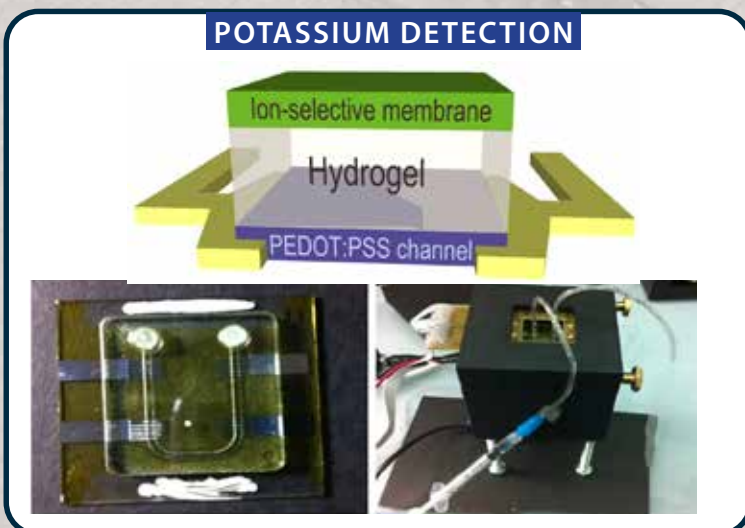
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**MERCURY, CALCIUM, COPPER DETECTION**



**POTASSIUM DETECTION**



**POTASSIUM/SODIUM DETECTION**

