Electrochemical Sensors

Development of electrochemical sensors based on self-assembled monolayers, carbon nanotubes and electospun fibres

The development of electrodes modified with metallophthalocyanines at nano-scale for detection of substances that are important in the environmental, medical and biological sector, is of importance. In order to construct materials with optimum properties, the study of phthalocyanine molecules organized as supramolecular structures such as thin films (by polymerization) and self assembled monolayers (SAMs) will be undertaken. The fabrication of carbon nanotubes (CNT) and their use in improving the electrode behaviour will be explored. As stated above the phthalocyanine molecules (in the presence and absence of CNTs) have a diverse range of applications - hence we have been using SAMs and electropolymerized phthalocyanines as sensors for a range of molecules, including environmentally important molecules such as thiols and pesticides.

Electrospinning is a method to produce nanofibres on conductive surfaces by forcing solutions containing polymers to travel from the tip of a capillary to a collecting target by applying a high voltage (few kV) between capillary tip and collecting target. On its way, the jet of solution starts to split (known as spraying) due to solvent evaporation, and results in the deposition of nanofibres on the collecting target. The advantage of this way of deposition is that the ratio of active surface/geometrical surface is much bigger than for common deposition methods. The formed fibres will be used for the detection of medically important molecules such as NO detection for air filtration.