Sonochemically Fabricated Enzyme Micro-electrode Arrays for the Environmental Monitoring of Pesticides.

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In this presentation and accompanying paper we will firstly describe a novel sonochemical fabrication technique for manufacture of micro-electrode arrays with micro-electrode population densities up to $2x10^5$ micro-electrode elements cm^{-2} via the sonochemical ablation of non-conductive polymer films which coat and thereby insulate underlying conductive surfaces [1].

Exploitation of these arrays will be described via the development of a multi-channel array of acetylcholinesterase (AChE) based biosensor for the environmental determination of pesticides to allow fast and efficient warning of pollution incidents and to assay levels of pollution. Arrays of this type may be formed via the electrochemical polymerisation of enzyme containing conducting polymers at the exposed electrode elements within the array and utilise a number of commercial and recombinant sources of enzyme [2,3] that exhibit differing sensitivities.

Sensor designs of this type experience hemi-spherical diffusional transport phenomena and thus enjoy stir independence response characteristics as well as permitting lowered limits of detection that would otherwise not be possible (in some cases $< 10^{-11}$M for some pesticides). Arrays such as these may either be interrogated either (a) amperometrically or alternatively (b) via *ac* impedimetric approaches to allow further discrimination between target organo-phosphate, carbamate and pyrethroids pesticides. These two approaches will be compared and the nature of the transduced signals discussed.

References:

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