

Proceeding Abstracts
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Abstract No.1

**Conformational Change of Glucose Oxidase on Ionic
Liquid/MWCNTs Nano-composite**

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Protein conformational changes may be associated with particular properties such as function, transportation, assembly, tendency to aggregate and potential cytotoxicity. Protein misfolding, in particular, has been intimately related to protein-mediated diseases. In this study, the conformational structure changes of glucose oxidase (Gox) induced by the assembly on Ionic liquid (IL)/Carbon nanotube (CNTs) surface were studied in detail by various spectroscopic techniques including UV-vis absorption, fluorescence and circular dichroism (CD). The assembly of Gox on the boundary surface of CNTs could result a disturbance of the structure of Gox and induce the exposure of the prosthetic group and tryptophan (Trp) residues to the solvent, leading to a less shielded GOD active site. The result of CD spectra of the Gox/CNTs bioconjugate system showed that CNTs could induce the conversion of α -helix to β -sheet structures and unfolding of the protein. The results of UV-vis, CD spectra and fluorescence demonstrate that Gox conjugate with IL/CNTs nano-composites does not undergo the structural change and remains its native integrity. Thus ILs is able to generate and maintain an excellent non-conventional environment for proteins. The stability, activity, selectivity and enantioselectivity of the enzyme which are highly affected by the nature of IL can be fine tuned by choosing the appropriate cation and anion.

Keywords: Glucose Oxidase, Circular Dichroism, Nano-Composite, Ionic Liquid.

Abstract No.2

**Triggered Gene Expression Inside Fed-Vesicle Microreactors
with a Multifunctional Membrane**

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We established a method to successfully produce lipid vesicles encapsulating a DNA template and a minimal gene expression system for mRNA and protein synthesis. Our method is compatible with a variety of natural and functionalized lipids, which allowed us to engineer the vesicle membrane for surface immobilization and for promoting selective exchange with the environment. We demonstrated that gene expression can be triggered by supplying the nutrients – amino acids, nucleotides, tRNAs – in the outside solution. Protein synthesis can take place in liposomes with a broad range of sizes and the level of expression varies markedly between individual vesicles. We believe that our results are of direct relevance for initiating, regulating and monitoring biochemical reaction networks in general, with far-reaching consequences to the construction of artificial cells and next generation drug delivery systems.

Keywords: Gene Expression, Fed-Vesicle Microreactor, Liposome, Artificial Cell.
