MONASH University

Department of Chemical Engineering

TRANSFER SEMINAR

Protein Transport in Mesophase Material

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Thursday 1st May 2008, Building 36, Room 222, 4 – 5pm.

Abstract:

Capillary electrophoresis provides a tool for the rapid and efficient separation of a range of compounds based on their mobility differences in an electrical field. However, macromolecular separation (e.g. for proteins and other biomolecules) is not achievable as the mass-to-charge ratios are reduce for these larger molecules. New, porous materials incorporated into a capillary electrophoresis device can overcome this limitation. Lipid-based, self-assembled systems of mesophase materials have previously been studied for drug, protein and vaccine delivery applications. Due to its three dimensional nanostructure and biocompatibility, mesophase materials could also provide a macromolecular separation solution.

The feasibility of using nanostructured self-assembled materials in capillary electrophoresis for the partitioning of molecules is the main focus of this research. To this end, microchip-based separation technologies employing electrophoretic fields are being explored.

A micro-fluidic chip has been designed and fabricated using a standard photolithography technique. The micro-channel has a width of 70 □m and a depth of 35 □m. Electrokinetic studies of the mesophase material showed the potential for capillary electrophoretic separations at low applied electrical fields (up to 100 V cm^{-1}). Separation experiments using various dyes in 100% buffer-filled capillaries were also carried out under electrophoretic conditions with the dye molecules being successfully separated.

Note:

Alan Chan is the recipient of a CSIRO postgraduate scholarship and is co-supervised by Drs Patrick Hartley and Yonggang Zhu, CSIRO and Dr Gareth Forde, Monash University.