486e Langmuir-Blodgett Technique as a Tool for the Synthesis of Nanostructures

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Langmuir-Blodgett (LB) technique is one of the most useful methods in the fabrication of two dimensional (2D) structures with the molecular level precision. Recently, we have developed patterned LB techniques that are used to organize nanoparticles in large ordered arrays. In this presentation, I will discuss the application of LB technique as a synthetic and processing tool for making porous membranes of ~10 nm Fe_2O_3 and Pt nanoparticles from their LB films through a matrix carbonization process. I will further discuss the formation of porous carbon nanotubes (pCNTs) from patterned LB films. These two examples will be used to illustrate the versatility of LB technique in the fabrication of novel nanostructures. The compositions and structures are characterized by UHV-TEM, SEM, EDX, XPS, electron diffraction, and Raman spectroscopy. The application of Pt porous membrane as electrocatalysts in the direct oxidation of methanol will be discussed.