

Fabrication,  
Characterization and  
Application of Nanowell  
Arrays

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In this work, highly ordered alumina membranes are used as masks to etch substrate such as glass to obtain arrays of nanowells. The depth of the nanowells can be controlled by changing the etch time, and the diameter of the nanowells can be controlled by the pore size of the alumina mask. Inside and outside of the nanowells are modified with different chemistry. As a result, the concurrent analytes such as nanoparticles or biomolecules can be specifically attached. So far, silica nanoparticles have been successfully attached to the inside nanowells. By combination of porous alumina mask and other porous pattern, different patterns can be obtained as well. Atomic force microscopy (AFM), field emission scanning electron microscopy (FESEM), spectroscopy and electrochemistry method will be used to characterize the nanopatterns.

These arrays of the nanowells will be investigated for several applications. Because of the nanosize and small volume of the nanowells, we are expecting much lower detection limits in electrochemistry detection of analyte. Also, the specific modification of molecules can be used to detect corresponding molecules.