

RESEARCH PROPOSAL

SILICA NANOSPHERES- SYNTHESIS, CHARACTERIZATION AND USING IT AS A TEMPLATE FOR REALIZING PERIODIC NANO STRUCTURES BY COLLOIDAL LITHOGRAPHY

ABSTRACT:

The process of producing highly ordered array of nanostructures always been a complex process, until the introduction of a simple technique called colloidal lithography which uses colloidal spheres as masks or template for deposition of desired materials over it. Mostly polymer nanospheres are used as masks but here we use silica spheres due to their simple production methods, these templates aids in the formation of ordered arrays of nanostructures. This technique is a simple and cost effective compared to other lithographic technique which are used in preparation of ordered array of nanostructures. In this present study we use this lithographic technique for fabrication and realizing of nanostructures with the aid of silica nanospheres as mask material.

MOTIVATION:

The need for fabrication of nanostructures is paramount due to their applications in wide range of fields like polymer electronics, micro electromechanical system (MEMS) and nanoelectromechanical system(NEMS) but the conventional lithographic techniques like electron beam lithography,x –ray lithography needs complex equipments and high cost which is hard for researchers to attain them fr the reason of that I use colloidal lithography which makes use of self organization mechanism of colloidal particles to form nanofabrication templates

WORK PLAN:

- Literature survey
- synthesis of silica nanospheres
- characterization of silica nanospheres by SEM ,TEM,DLS
- deposition of nanosphere over substrate by deposition methods like spin coating
- characterization of substrate ,examine the substrate for monolayer formation by AFM
- deposition of desired material over sphere template
- removal of spheres
- deposition of metal inside the pores by thermal vapour deposition,pores which is formed after removal of nanospheres
- removal of template by solvent immersion
- characterization of nanostructures