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OPTICAL AND SPECTROSCOPIC PROPERTIES OF SELF-ASSEMBLED NANOPARTICLES

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In recent years, there has been an increasing interest in the synthesis of nanostructures (LIU et al., 2003) due to their various potential applications such as optoelectronic (SHIPWAY et al., 2000), microelectronic (LYNCH et al., 1997), and bio-moleculars (GRABAR et al., 1995). Fabrication of nanostructures by self-assembled methods has attracted much attention due to their simplicity and flexibility (WANG et al., 1998). A method for control of surface morphology (KEATING et al., 1998; FREEMAN et al., 1995; XIA et al., 2000) is through assembly of small, spherical, uniformly sized particles at an interface, imparting a repeating feature size that is dependent upon the particles used. In the present work gold colloids were prepared and self-assembled onto glass substrates by using an organic coupling agent as 3-aminopropyltrimethoxysilane (APTMS). Moreover, polystyrene beads were also assembled in a regular hexagonal lattice on hydrophilic glass slides surfaces. The substrates were characterized by transmission electron microscopy (TEM) and optical absorption spectroscopy (Fig. 1). The optical absorption spectra show a well defined surface plasmon resonance peak at 520 nm for the self-assembled gold monolayers and at 632 nm for the gold coated polystyrene nanospheres. The as prepared substrates are under current investigation for applications in the field of surface plasmon resonance (SPR), optical biosensing as well as in surface-enhanced Raman spectroscopy (SERS) studies.

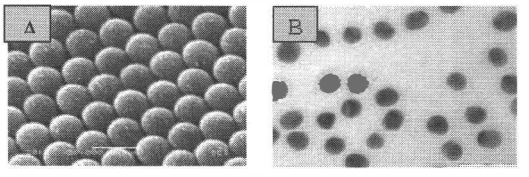

Fig. 1. TEM images of self-assembled nanoparticles:
(A) polystyrene nanospheres
(B) gold colloids

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