Nanocomposite Colloids Containing Magneto-Optical and Superhydrophobic Properties via Covalent Bond in Non-polar Solvent

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We introduce a layer-by-layer-assembled nanocomposite via covalent bonding in a non-polar solvent. The oleic acid-stabilized quantum dots (QDs) and magnetic nanoparticles (MPs) were synthesized, and stabilizers were exchanged to 2-bromo-2-methylpropionic acid (BMPA) without any change of solvent polarity. And nanocomposite were prepared with BMPA-QDs (or BMPA-MPs) and amine-functionalized poly(amidoamine) dendrimers in a nonpolar solvent. The reaction was performed via covalent bonding between bromine and amine. It could overcome drawback of conventional processes that proceeded in aqueous solution such as a low packing density by electrostatic repulsion and reducing inherent properties of nanoparticles. It showed long-term stability in non-polar solvents. Furthermore, deposition of these colloids onto flat substrates produced a hierarchical surface morphology that exhibited superhydrophobic properties with water contact angles bigger than 150°.