Surface Modification of Hydrophobic TiO_2 Nanorods

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The use of TiO2 nanorods synthesized in organic solvent has been hampered since they are not dispersible in polar solvents. In this work new method to make hydrophobic TiO2 nanorods dispersible in polar solvent has been developed. The key of success is based on the modification of TiO2 surface using short chain-acrylic acid utilized both as an anti-solvent and as an exchanging ligand. The mechanism of ligand exchange process and properties of products have been characterized using techniques such as TEM, XRD, FTIR, UV-Vis, GC-MS, XPS, and TGA. The results show that the stability of acrylic acid-coated TiO2 nanorods in polar solvent is excellent without any agglomeration even after three months. The approach provides a strategy to make TiO2 nanorods applicable to industries such as nanocomposite, biochemistry and can be applied to functionalize other nanocrystals covered by different hydrophobic ligands