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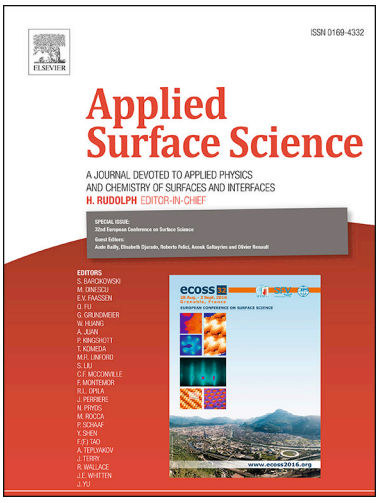

Full Length Article

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TiO_2 Nanoscale Ionic Materials using Mussel Adhesive Proteins Inspired Ligand

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ABSTRACT: Inspired by mussel adhesive proteins, solvent-free nanoscale ionic materials (NIMs) were prepared using Tiron as bridging ligand, which could coordinate with titanium dioxide nanoparticles (TiO_2 NPs) through ligand exchange, and then bridged with nonylphenyl poly(ethylene glycol) quaternary ammonium salt via ion exchange. The obtained homogenous TiO_2-NIMs showed liquid-like behavior at room temperature. UV-visible and FT-IR spectra confirmed the coordination interaction between Tiron and TiO_2 NPs. The size and crystal structure of TiO_2 NPs were preserved during the modification. The well dispersion of NPs in the organic component, and the high content, low crystallization and melting temperature of the organic component guaranteed the unique properties of TiO_2-NIMs. Moreover, TiO_2-NIMs showed amphiphilic nature with good solubility and long-term stability in polar and nonpolar solvents. This research offers a useful and versatile approach to prepare NIMs and expands the gallery of bio-inspired materials.

KEY WORDS: nanoscale ionic materials, bioinspired, mussel, titanium dioxide, Tiron