

Synthesis of Metal Oxide loaded Mesoporous TiO₂ materials for UV-Light Blocking

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Crystalline titanium dioxide (TiO₂) is one of the most important wide band gap semiconducting materials and is widely investigated for use in photoelectrolysis, photocatalysis, heterojunction solar cells, environmental purification, and gas sensing. Especially, the TiO₂ materials have been also attracted much attention as sun-screening materials in cosmetics, due to the excellent UV-light blocking (or absorbing). In the present work, we have synthesized mesoporous TiO₂ with crystalline framework and high surface areas. In order to enhance the UV-light blocking property, various kinds of metal oxides have been loaded within the mesopores of TiO₂ materials. The physicochemical properties of TiO₂-based composite materials thus obtained have been investigated by using X-ray diffraction technique, N₂ adsorption-desorption analysis, scanning electron microscope, transmission electron microscope, and UV-visible spectroscopy. Metal oxides loaded mesoporous TiO₂ materials exhibit higher UV-light blocking effect than the TiO₂ materials without other metal oxides, which is probably due to increase of reflective index and enhancement of UV/VIS absorption properties.