Optical Properties of Nano-sized Fe_2O_3/TiO_2 Pigments Synthesized by Homogeneous Precipitation

이현주, 정경열†
공주대학교
(kyjung@kongju.ac.kr†)

Increasing the temperature inside a metropolitan building or automobile due to solar radiation causes a lot of energy consumption. Among them, near-infrared rays, which account for 52% of the solar spectrum, collide with objects and raise their temperature. An effective way to prevent heat buildup in buildings and automobiles is to cover cool pigments on their surfaces. White pigments such as TiO_2 are effective in terms of infrared reflection but have the disadvantage of being easily discolored by contamination and thereby causing visual discomfort. Therefore, it is important to develop pigments having high infrared reflecting properties in various colors. In this study, the optical properties of Fe_2O_3, a representative inorganic red pigment, were improved by combining with TiO_2 nanoparticles. Tens of nanometers of Fe_2O_3 particles were coated on the surface of about 100 nm TiO_2 particles using a homogeneous precipitation method. The chromaticity and infrared reflectance of Fe_2O_3/TiO_2 Pigments prepared were evaluated as changing the synthesis conditions. After coating on the metal plate, the infrared rays were irradiated to evaluate the effect of preventing the temperature rise.