



Advanced Powder Technology

Volume 23, Issue 1, January 2012, Pages 55–63



Original Research Paper

Decolorization of beads-milled TiO₂ nanoparticles suspension in an organic solvent

I Made Joni^{a, b}, Takashi Ogi^a, Agus Purwanto^c, Kikuo Okuyama^a,  , Terunobu Saitoh^d, Kazutaka Takeuchi^d^a Department of Chemical Engineering, Graduate School of Engineering, Hiroshima University, 1-4-1 Kagamiyama, Higashi Hiroshima, Hiroshima 739-8527, Japan^b Department of Physics, Faculty of Mathematics and Natural Science, Padjadjaran University, Jl. Raya Bandung-Sumedang KM 21, Jatinangor 45363, Indonesia^c Department of Chemical Engineering, Faculty of Engineering, Sebelas Maret University, Jl. Ir. Sutami 36 A, Surakarta, Central Java 57126, Indonesia^d Material Processing Research Department 3, Canon Inc., 70-1, Yanagi-cho, Saiwai-ku, Kawasaki-shi, Kanagawa 212-8602, Japan<http://dx.doi.org/10.1016/j.apt.2010.12.008>, [How to Cite or Link Using DOI](#)[Permissions & Reprints](#)[View full text](#)[Purchase \\$31.50](#)

Abstract

In this paper, a new method is proposed for the decolorization of a yellow-hued suspension of rutile TiO₂ nanoparticles in an organic solvent (diethylene glycol dimethylether). The presence of color has always been undesirable in a suspension of nanoparticles filler used for industrial needs, particularly for optical applications.

A colorless suspension was achieved by irradiating well-dispersed TiO₂ nanoparticles in an organic solvent with UV-light ($\lambda = 254$ nm) for 5 h. TiO₂ nanoparticles of 1 and 5 wt.% were dispersed using a beads mill method. Trimethoxytrifluor(propyl) silane was used as a dispersant to achieve stability. The effect of the UV-light irradiation on the TiO₂ nanosuspension was investigated by means of a Fourier transform nuclear magnetic resonance analyzer (FT-NMR). The dispersant was partially desorbed due to the interaction of UV light and the TiO₂/dispersant complex. Thus, an enhanced transparency and the absence of color were obtained for well-dispersed TiO₂ nanoparticles in an organic solvent.

Keywords

TiO₂; Nanoparticle dispersion; Decolorization; Beads mill

Figures and tables from this article:

