

Porosity characteristics of mesoporous TiO₂ nanocrystals prepared with neutral surfactants of different chain lengths

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We prepared mesoporous TiO₂ nanocrystals with neutral surfactants of different chain lengths - dodecylamine (C₁₂) and hexadecylamine (C₁₆). Porosity characteristics of mesoporous TiO₂ nanocrystals were investigated through a nitrogen adsorption-desorption technique, X-ray diffraction, and Fourier transform infrared spectroscopy. Thermal treatments led the changes in porosity of mesoporous TiO₂ nanocrystals, the growth of crystal sizes and even phase transformation. The higher calcination temperature, the larger pore diameters and crystal sizes. The rutile phase of mesoporous TiO₂ appeared as calcined at 873 K. Porosity characteristics exhibited differently due to the effect of surfactant chain length. N₂ adsorption-desorption isotherms indicated that mesoporous TiO₂ nanocrystals using dodecylamine contained a relatively more textural mesoporosity compared to that using hexadecylamine. This result also explained well that the average pore diameter of mesoporous TiO₂ using shorter alkyl chain length was larger than the other case.