PC-10

SYNTHESIS AND PHOTO-CATALYTIC ACTIVITIES OF N-DOPED TITANIA NANO-CHAINS

Cheol-jin Jung, Minjoong Yoon

Department of Chemistry, Chungnam National University Daejon, 305-764, KOREA

Photocatalysis has emerged to be one of the most promising pollution remediation technologies in recent decades. Of all the photocatalysts, TiO_2 is the most widely studied one. It is very stable, cheap to produce and is capable of degrading a wide range of organic pollutants. However, the semiconductor TiO_2 has its shortcomings. Due to its wide bandgap, it can only be activated by near-UV radiation. In order to overcome these problem, some metal ions have been doped into the lattice of the TiO_2 catalysts. This modifies the electronic structure of TiO_2 by narrowing the bandgap, rendering the doped TiO_2 more sensitive to the visible light. In this study, the nitrogen-doped TiO_2 anatase powders were synthesized by hydrothermal digestion of the hydrolysis product of ammonium titanyl oxalate with ammonia. The TEM images of N-doped TiO_2 show that chain-like structure was composed of 20nm sized single crystalline. The BET surface area of this powder was $87.75 m^2/g$. We also evaluated the XRD patterns for this powder and the crystal structure was pure anatase. In the UV-Vis absorption spectrum, nitrogen doping causes the absorption edge of TiO_2 to shift to a lower energy region. It is considered that nitrogen atoms in doped TiO_2 anatase powder are responsible for the significant enhancement in the doped TiO_2 photoactivity under visible light irradiation. We found the photocatalytic activity of the N-doped TiO_2 nano-chain was higher than that of the commercial TiO_2 anatase for methyl orange decomposition under visible light and UV light irradiation.