

Metal and Non-metal Dopants effect on Photocatalytic Activity of Titanium

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Titanium dioxide (TiO_2) is a photocatalyst that ejects electrons upon UV illumination. The resulting highly oxidative electron hole leads to radicals, oxidants and reductants (ROR) which are useful for sterilizing and decontaminating air and water. We sought to determine whether doping TiO_2 with various compounds during synthesis might improve photo-catalytic activity. TiO_2 was synthesized according to a patented technology (Woodfield, 2008), and was doped at different molar ratios using various Zn and Mn salts. X-ray fluorescence (XRF) was used to analyze synthesized powders before and after calcination in order to verify dopant concentration. A Terephthalic acid (THA) fluorescent dosimeter was used to determine the effect of each dopant on photocatalytic activity. All doped samples showed decreased activity compared to commercial Evonik P-25 TiO_2 . For both Zn and Mn, the anion of the dopant was important, with sulfate, nitrate, chloride, and acetate salt showing sequentially lower activity.