

Preparation of Cu ion doped TiO₂ nanotube(TNT) and photocatalytic water splitting under visible light

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Nano-sized TiO₂ and TNT catalysts were synthesized by using a sol-gel and alkaline hydrothermal method. These catalysts were doped by Cu using impregnation method. The prepared catalysts were characterized by XRD, XPS, FT-IR, BET, FE-SEM, TEM and UV-Vis-DRS. The results showed that nano-sized TiO₂ was crystallized to mainly anatase structure; the average particle size was 12 nm, and the particle size was not effected by pH conditions. And TNT catalysts were well crystallized with average diameter of 6 nm and average length of several hundred nanometer. The Cu ion doping on photocatalysts greatly increased the absorption of visible light. The enhanced absorption of visible light can be attributed to the charge transfer of 3d electron of Cu ions to the conduction band of TiO₂.