

Improved Photocatalytic Activity of Nanoporous WO_x - TiO_2 composites using Nano-Propping Effect

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Among various kinds of waste water treatments, photocatalysis is environmentally friendly, because it requires sunlight only without any other oxidants which could also contaminate environments. In order to apply photocatalysis to the water treatment processes, photocatalysts should degrade most of organic wastes in the early stage. Obtaining nano-propping effect by impregnated WO_x in pores increased pore structure stability during annealing for high crystallinity of TiO_2 at high temperature. Amorphous WO_x and TiO_2 would form a type II heterojunction, and it allows the excited electrons from TiO_2 to transfer to WO_x , and holes in the opposite way. Therefore, WO_x - TiO_2 composite would be effective heterostructured materials for photocatalysis in the early reaction stage. In this study, amorphous WO_x was promoted (or impregnated) on mesoporous TiO_2 via incipient wetness-impregnation method, and annealed at different temperatures up to 700 °C. Photocatalytic activities of prepared materials are evaluated with model dyes under UV light. The initial photocatalytic activity was calculated by pseudo-1st order kinetic model during initial 1 h.