

Design of Ag₃PO₄ for highly enhanced photocatalyst using hydroxyapatite as a source of phosphate ion

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Abstract	The effect of hydroxyapatite on structure, particle size, and band gap energy of silver orthophosphate (Ag ₃ PO ₄) have been investigated. The hydroxyapatite as a source of phosphate ion was prepared using the coprecipitation of Ca(2) and KH ₂ PO ₄ . To produce the product of Ag ₃ PO ₄ , the as-synthesized hydroxyapatite was suspended in water and quickly added to a silver nitrate solution. The obtained photocatalysts were characterized using XRD, SEM, DRS, and XPS. The high crystallinity of single phase Ag ₃ PO ₄ was easily produced using the hydroxyapatite. Photocatalytic activities of the product were evaluated using RhB decomposition under blue light irradiation. The hydroxyapatite as a source of phosphate ion dramatically decreases the particle size and increases the absorption in the visible region. This obtained photocatalyst significantly improves the photocatalytic activity. The mechanism of reaction works in the following order: holes > superoxide radical > hydroxyl radical.
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