Surface engineering of Ag3PO4 using lithium iodide for enhanced photocatalytic activity

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Abstract	The surface engineering of Ag3PO4 using lithium iodide was successfully carried out to induce photocatalytic properties. The Ag3PO4 surface was treated using a lithium iodide solution from low to high concentration under stirring and continued with aging. The modified Ag3PO4 samples were characterized using XRD, SEM, BET, UV-Vis DRS, PL spectra, TRPL, Raman spectra, and XPS. LiI treatment on the Ag3PO4 surface decreases a symmetric stretching [PO4] tetrahedron, P/Ag atomic ratio, and FWHM of Ag3d and P2p, and increases the kinetic energy of AgMNN Auger electrons. These phenomena were due to the incorporation of iodine on the Ag3PO4 surface and defect formation on the Ag3PO4 surface. Treatment with a low concentration of LiI solution showed higher photocatalytic activity with a rate constant of 9.05 times faster than samples without LiI treatment. The high photocatalytic activity was due to the suppression of hole and electron recombination, stronger hole species, and high adsorption on the surface of Ag3PO4.
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