

Synthesis of silver orthophosphate under dimethyl sulfoxide solvent and their photocatalytic properties

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Abstract	The silver orthophosphate was successfully synthesized using the starting materials of AgNO ₃ , KH ₂ PO ₄ under water and dimethyl sulfoxide (DMSO) solvents. The variation of DMSO in water was designed at 0, 5, 10, 15, 20 and 100% (v/v). The products were characterized by XRD, DRS, and SEM. The photocatalytic properties were evaluated under the blue light irradiation using the methyl orange degradation. The results showed that the DMSO significantly affected the morphology, particle size and bandgap energy of Ag ₃ PO ₄ . The addition of DMSO decreased the particle size of Ag ₃ PO ₄ and changed the tetrahedron into an irregular shape. The bandgap energies of 2.33, 2.28 and 2.42 eV were observed in the sample prepared with the content of DMSO at 0, 15 and 100% respectively. The highest photocatalytic activity was found at 15% DMSO. This excellent photocatalytic activity might be due to the lower bandgap energy and the higher intensity ratio of [222]/[110] facet.
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