

Facile Synthesis of Potassium Vanadium Fluorophosphate: Semiconducting Properties and Its Photocatalytic Performance for Dye Degradation under Visible Light

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Abstract : Due to the increase in the trade of colored products and their applications in various fields such as cosmetic, food, textile, pharmaceutical industries, etc. Dyes constitute a large part of the contaminants in wastewater and cause serious damage in the environment and the aquatic system. Photocatalytic systems are highly efficient processes for treating wastewater in the presence of semiconductor photocatalysts. In this field, we report our contribution by synthesizing a potassium vanadium fluorophosphate compound KVPO₄F (which is abbreviated KVPOF) by a simplified hydrothermal method at 180°C for 5 days. The as synthesized product has been characterized physically and photoelectrochemically. The indirect optical transition of 1.88 eV, determined from the diffuse reflectance, was assigned to the charge transfer. Moreover, the curve (C-2-E) of the KVPOF displayed n-type character of the semiconductor. Even more, interestingly, the photocatalytic performance was evaluated through the photo-degradation of cationic dye Methyl Violet (MV). An abatement of 61% was obtained after 6 h of irradiation under visible light.

Keywords : KVPO₄F, photocatalysis, semiconductor, wastewater, environment

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