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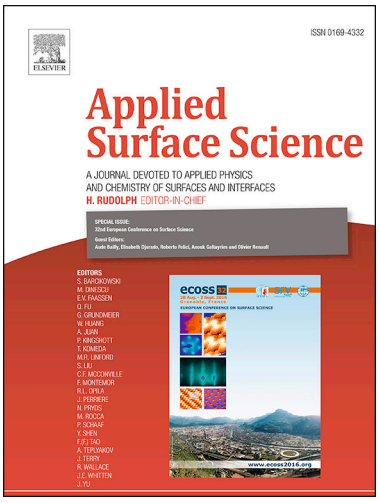

Full Length Article

In Situ Synthesized MoS_2/Ag dots/Ag_3PO_4 Z-Scheme Photocatalysts with Ultrahigh Activity for Oxygen Evolution under Visible Light Irradiation

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ACCEPTED MANUSCRIPT

In Situ Synthesized MoS_2/Ag dots/Ag_3PO_4 Z-Scheme Photocatalysts with Ultrahigh Activity for Oxygen Evolution under Visible Light Irradiation

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Abstract

MoS_2/Ag_3PO_4 heterojunction photocatalysts have attracted great attention in dye degradation and water oxidation, in which Z-scheme plays a critical role in the catalytic performance as a result of energy band structure alignment between MoS_2 and Ag_3PO_4. Creating metal sites at composite interfaces as recombination centers of photo-generated electrons from conduction band (CB) of Ag_3PO_4 and holes from valence band (VB) of MoS_2 is an effective strategy to enhance the charge separation efficiency and photocatalytic performance. Strong coupled MoS_2/Ag dots/Ag_3PO_4 ternary heterojunction photocatalysts were fabricated by one-pot precipitation method, in which highly dispersed Ag dots are located at the MoS_2/Ag_3PO_4 interfaces and MoS_2 is bonded with PO_4^{3-} in the form of Mo-O-P. The fabricated MoS_2/Ag dots/Ag_3PO_4 photocatalyst presents a 2.8-fold enhancement of photocatalytic activity of water oxidation compared to that of pristine Ag_3PO_4, which is achieved for the first time. The great enhancement of photocatalytic performance can be ascribed to the improved Z scheme mechanism with strongly coupled MoS_2/Ag dots/Ag_3PO_4 ternary interfaces, in which highly dispersed Ag dots serve as efficient recombination centers resulting in the improved separation of photo-generated holes and electrons of Ag_3PO_4 as well as photocatalytic activity of oxygen evolution.

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