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| Title | Nanostructured LaFeO3-MoS2 for efficient photodegradation and photocatalytic hydrogen evolution | | |
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| Abstract |  |
| Fabrication of heterogeneous photocatalysts has received increasing research interest due to their potential applications for the degradation of organic pollutants in wastewater and evolution of carbon-free hydrogen fuel via water splitting. Here, we report the photodegradation and photocatalytic hydrogen generation abilities of nanostructured LaFeO3-MoS2 photocatalyst synthesized by facile hydrothermal technique. Prior to conducting photocatalytic experiments, structural, morphological and optical properties of the nanocomposite were extensively investigated using X-ray diffraction analysis, field emission scanning electron microscopy and UV-visible spectroscopy, respectively. Nanostructured LaFeO3-MoS2 photodegraded ~96% of rhodamine B dye within only 150 minutes which is considerably higher than that of LaFeO3 and commercial Degussa P25 titania nanoparticles. The LaFeO3-MoS2 nanocomposite also exhibited significantly enhanced photocatalytic efficiency in the decomposition of a colorless probe pollutant, ciprofloxacin eliminating the possibility of the dye-sensitization effect. Moreover, LaFeO3-MoS2 demonstrated superior [photocatalytic activity](https://www.sciencedirect.com/topics/physics-and-astronomy/photocatalytic-activity) towards solar hydrogen evolution via water splitting. Considering the band structures and contribution of reactive species, a direct Z-scheme photocatalytic mechanism is proposed to rationalize the superior photocatalytic behavior of LaFeO3-MoS2 nanocomposite. | |