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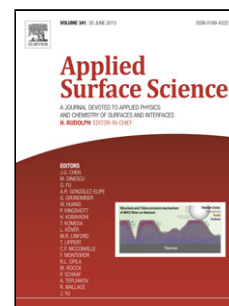
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Photoelectrochemical Enhancement of ZnO/BiVO₄/ZnFe₂O₄/Rare Earth Oxide Hetero-Nanostructures

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Highlights

- A ZnO/BiVO₄/ZnFe₂O₄/rare earth oxide hetero-nanostructure is synthesized.
- Rare earth slag is employed as iron source for the fabrication of ZnFe₂O₄.
- Rare earth oxide forms a passivation layer for photoelectrochemical anode.
- A cascade band-alignment is constructed by ZnO, BiVO₄ and ZnFe₂O₄.
- The enhanced photoelectrochemical efficiency is demonstrated and analyzed.

Abstract

Over the decades, researchers have made great efforts to turn the world into a cleaner place through efficient recycling of industrial waste and developing of green energy. Here we demonstrate a prototype heterostructure photoelectrochemical (PEC) cell fabricated using recycled industrial waste. ZnFe₂O₄ (ZFO) nanorod (NR) clusters were synthesized on the BiVO₄@ZnO hetero-nanostructures using recycled rare earth oxide (REO) slags as Fe source. The NR-based PEC cell exhibited a significantly enhanced photon to hydrogen conversion

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