

Study about an assembly of iron(III) hexacyanoferrate(II) and α -Fe₂O₃ as a secondary photocell: Part 1. Synthesis, characterization and photoelectrochemical properties of FTO/ α -Fe₂O₃/KFe[Fe(CN)₆]₃ electrode system

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This study addresses the synthesis and characterization of iron(III) hexacyanoferrate(II) (Prussian blue, PB) deposited on a semiconductor hematite electrode (α -Fe₂O₃). The formation of the Prussian blue/hematite interface was carried out by cyclic voltammetry. The modified electrode was morphologically characterized by scanning electron microscopy (SEM) and atomic force microscopy (AFM), structurally by x-ray diffraction (XRD), and photoelectrochemically by cyclic voltammetry under polychromatic illumination. The structure of the electrode system shows a cauliflower type morphology, with the typical PB structure. The electrochemical characterization indicates an increase of the currents of the low- and high-spin iron systems of PB when the system is illuminated,

indicating that photogenerated charge carriers are involved. © 2020 Elsevier B.V.

Photoelectrochemistry

Prussian blue

α -Fe₂O₃ semiconductor

Atomic force microscopy

Electrodes

Hematite

Photoresistors

Scanning electron microscopy

Electrochemical characterizations

Electrode systems

Modified electrodes

Photo-electrochemistry

Photoelectrochemical properties

Photogenerated charge carriers

Prussian blue

Synthesis and characterizations

Cyclic voltammetry