

Photocatalytic Hydrogen Production and Solar Energy Conversion by an Oxide Semiconductor

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The concept of using solar energy to solve the global energy and environmental problems has been intensified from the standpoints to a technological assessment, since the energy and environmental issues in a global level are important themes tackled in the 21st century. The photocatalytic decomposition of water with a semiconductor under visible light attracts increasing interest because the attempt is aimed not only at producing hydrogen from water utilizing solar energy, but also at finding methods of making use of the photosynthetic process as green plants for direct production.

A photoelectrochemical cell with semiconductor heterojunction electrodes, SrTiO₃/α-Fe₂O₃ and α-Fe₂O₃/WO₃ were prepared and their structures and properties were characterized, respectively. It was observed that the photocurrent and the incident photon to current conversion efficiencies (IPCE or external quantum efficiencies) of these heterojunction were higher than that of the singles, particularly under visible light irradiation. These semiconductor heterojunction electrodes have potential to be a photoanode for hydrogen production under sunlight illumination.

References

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