The 2019 World Congress on
Advances in Nano, Bio, Robotics and Energy (ANBRE19)
Jeju Island, Korea, September 17 - 21, 2019

Dual Functional Photoelectrochemical Systems for Water Treatment

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ABSTRACT

The photoinduced electron transfers occurring at the semiconductor surface are the key process of solar photosynthetic and photocatalytic transformation. This phenomenon has been extensively investigated for the environmental purification of water and air and the solar energy storage through solar fuel synthesis. In particular, this phenomenon has been actively utilized as a viable technology for purifying water and air. Metal oxides such as TiO_2, WO_3, and Fe_2O_3 and polymeric carbon nitride (g-C_3N_4) that consist of earth-abundant elements are the most practical base materials for photo(electro)catalysis. The base semiconducting materials have been modified in various ways to enhance the overall efficiency of photo(electro)catalysis. For example, the heterojunctions built at the interface of semiconductors reduce the charge recombination or enhance the interfacial charge transfer to achieve the higher conversion efficiency. In this talk, various modifications of semiconductor electrodes will be introduced and discussed for photoelectrochemical water treatment, in particular for dual functional photoelectrocatalysis for simultaneous water treatment and H_2 production.

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