# Novel Configuration and N-type materials for Unassisted Water Splitting for Hydrogen Production

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Following Fujishima and Honda's light-induced water-splitting experiment with a titanium dioxide (TiO2) semiconductor photoanode in 1972, worldwide research has been focused on the conversion of solar light into hydrogen as a clean and renewable source of energy. The photocatalytic splitting of water using oxide semiconductors is initiated by the direct absorption of photons, which creates separated electrons and holes in the energy band gap of the material. To harvest the generated electrons and holes, highly ordered TiO2 nanotube arrays, which have generated scientific interest in various fields, were synthesized by the anodic oxidation of Ti metal. However, TiO2 has too large a band-gap energy to allow for efficient visible-light absorption. In this presentation, we report on an investigation of TiO2 nanostructured material sensitized by low band-gap materials, such as CdS, CdSe, WO3, and Fe2O3 prepared by the one-step spray pyrolysis deposition method or electrodeposition method, which is very suitable for mass production, and their performance in photoelectrochemical cells (PECs) to produce hydrogen energy.