# Correlation among Band Structure, Charge Transfer and Photocatalytic/ Photoelectrochemical Performance of Semiconductors

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A record of energy conversion efficiency for a water-splitting photoelectrochemical cell has been reported to be 12.4% [1]. Commercial polycrystalline silicon-based solar cells have energy conversion efficiency of 14-19%. Commercialization of photocatalysts and photovoltaic devices is hindered by the limited energy conversion efficiency. This presentation will deal with the relationship among the band structure, the charge transfer, the energy transfer and the photocatalytic/photoelectrochemical performance of and solar energy materials. The charge transfer processes heavily depend on the band structure of semiconductors. The charge transfer processes determine the photocatalytic/ photoelectrochemical performance of semiconductors. Gaining fundamental understanding of the correlation among band structure, charge transfer and photocatalytic/ photoelectrochemical performance is the key to improving the energy conversion efficiency.

**References:**

[1] O. Khaselev and J. Turner, *Science*, 280 (1998) 425