Photocatalytic activity of dye-sensitized tin(IV) oxide nanocrystalline particles attached to zinc oxide particles: long distance electron transfer via ballistic transport of electrons across nanocrystallites

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Abstract

A catalyst comprising chains of dye-sensitized SnO_2 nanocrystallites (10–15 nm) attached to larger ZnO (~600 nm) particles is found to photogenerate hydrogen from water with visible light in the presence of a hole scavenger. The catalytic activity originates from ballistic injection of energetic electrons generated in sensitization of SnO_2, to the conduction band of ZnO which is above that of SnO_2. Wide charge separation suppresses recombinations, enabling separated charge to participate in chemical reactions. © 2001 Elsevier Science B.V. All rights reserved.

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