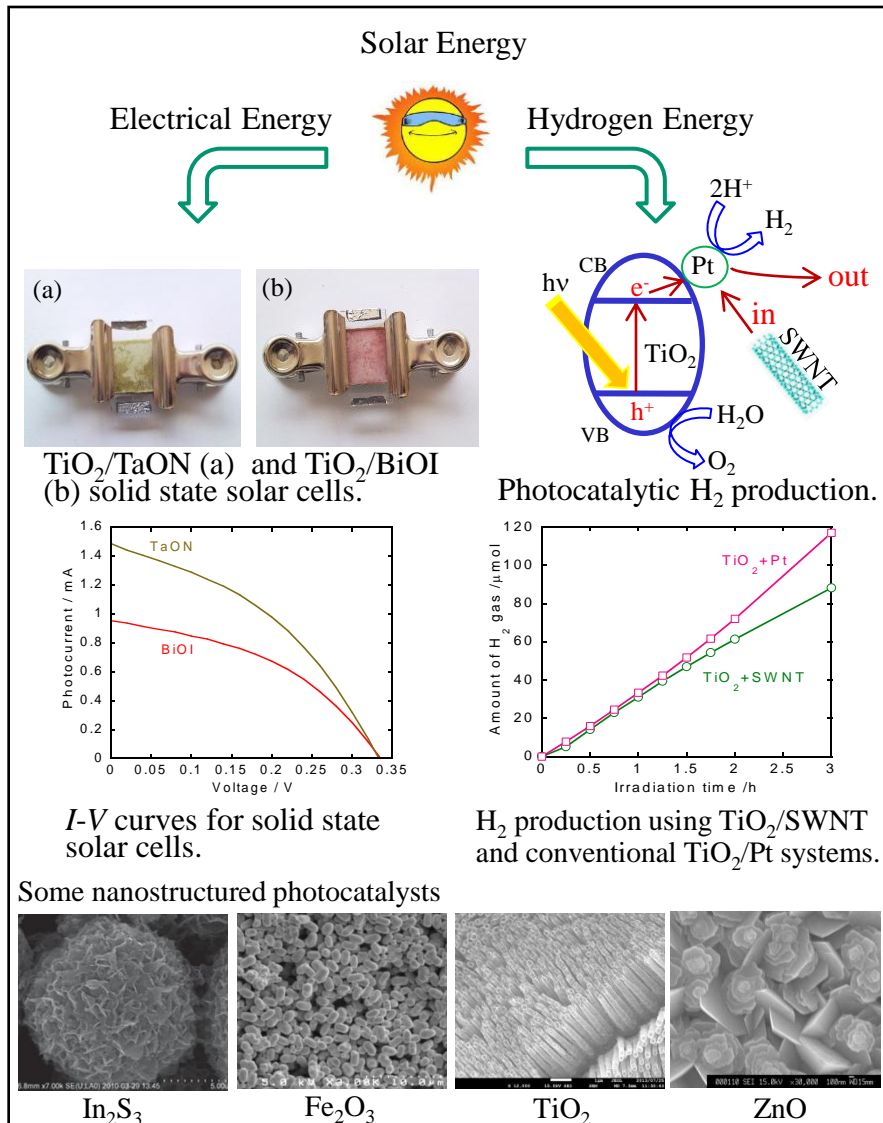


Nanostructured Semiconductor Photocatalysts for Solar Energy Conversion

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Content:

Solar energy can be converted in electrical energy (solar cell) or chemical energy (hydrogen energy). The key materials for the conversion of solar energy are semiconductor photocatalysts. Nanostructured semiconductor materials show interesting physical and chemical properties, which differ from their bulk. We synthesize and evaluate the activity of different semiconductor nanophotocatalysts and nanocomposites for efficient solar energy conversion (such as solar cell and hydrogen production via water splitting).

Generally, costly Pt is used with TiO₂ to enhance the activity of photocatalytic water splitting. But we successfully replaced Pt with single walled carbon nanotube for photocatalytic hydrogen production from water-alcohol mixture.

The semiconductor photocatalysts are also applied to low cost solar cells (wet type or solid state). For the first time we applied TaON and BiOI in a solid state solar cell. We continue our research to design highly active nanostructured photocatalysts (such as titania nanotube array, ZnO nano flower, hierarchical nanoparticles etc.) for efficient solar energy conversion.

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