Bioinspired Hybrid Systems for the Photoelectrocatalytic Generation of Solar Hydrogen and Fuels

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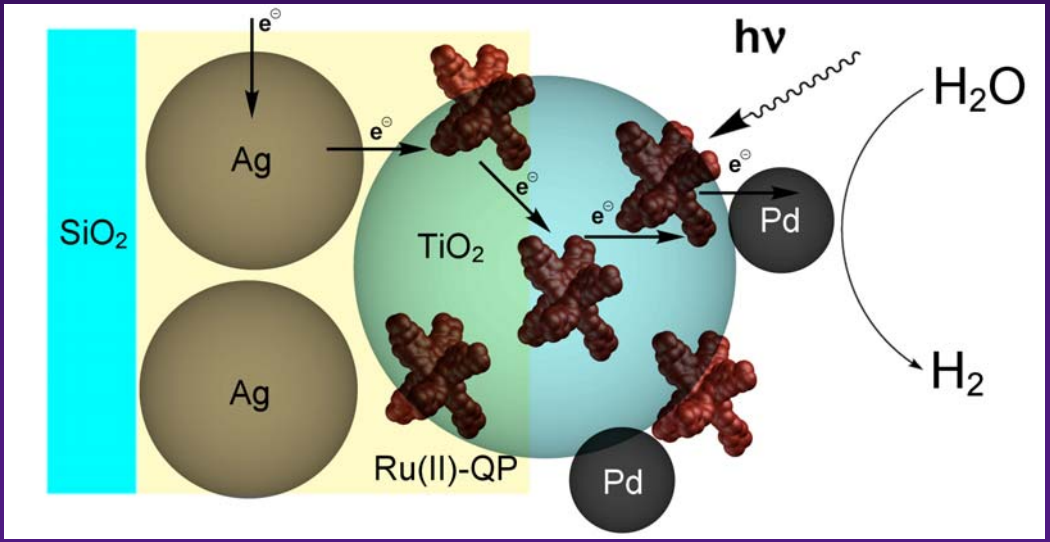
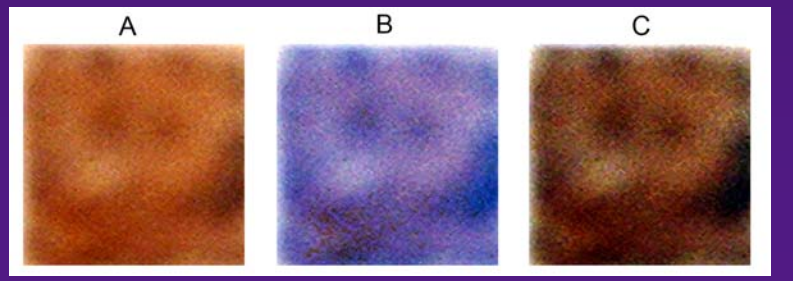
The **photoelectrochemical generation of hydrogen or hydrocarbons** and oxygen from water is a viable alternative to photocatalytic and solely electrochemical approaches. The key to this technology is finding ways to generate long-term stable and inexpensive materials for photoelectrochemical electrodes. We have focused our research on photocathodes for the reduction of carbon dioxide and water, consisting of the following components:



Photoelectrocatalytic generation of hydrogen from water using a composite-electrode made from silver-epoxy resin, TiO_2 / ruthenium-quaterpyridyl nanogels and palladium nanoparticles

- A non-conductive glass plate
- A layer of silver epoxy glue
- TiO_2/ruthenium-quaterpyridyl nanogels
- Palladium-nanoparticles

Photoelectrochemical reduction of H_2O to H_2 and of $NaHCO_3$ and H_2O to carbon and hydrocarbons was observed.



A: electrode before, B: during, C: after photoelectro-chemical reduction