

Cyclic Photocleavage of Water with the Intermediate Redox Couple $\text{Hg}_2\text{O}/\text{Hg}$

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It is found that water can be photodecomposed into oxygen and hydrogen by a cyclic two-photosystem process using TiO_2 as the sensitizer and the redox couple $\text{Hg}_2\text{O}/\text{Hg}$ as the electron pool linking the two photosystems. At neutral pH an aqueous suspension of TiO_2 and Hg_2O photooxidizes water, reducing Hg_2O to Hg . When the pH of the resulting solution is made strongly alkaline, water is photoreduced, oxidizing Hg back to Hg_2O .