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Progress on the Synthesis of an Artificial Leaf

The use of solar energy to drive fuel production to relieve growing global energy demands is being investigated. Solar energy has not been widely adapted due to the costs associated with photovoltaic panels and the inability to store the produced energy. One promising aspect of fuel production involves using solar energy to drive water splitting wherein the bonds are rearranged to produce fuels which can then be stored. The challenge in developing such a system is the production of oxygen from water and storage of the resulting fuels. The oxygen evolving catalyst of photosynthesis (OEC) has been successfully emulated using an inexpensive cobalt catalyst. The catalyst is similar to the OEC in plants in structure, ability to self-heal, and ability to split neutral water using light at atmospheric pressure and room temperature. A viable artificial "leaf" has been developed by coupling the catalyst to an inexpensive hydrogen producing catalyst via a photovoltaic panel or substrate that releases oxygen and hydrogen fuels. These fuels can be stored after production. Using abundant, inexpensive materials allows the device to be a promising energy alternative to addressing energy demands. A discussion of the progress of the device will be conducted.