

DIRECT SOLAR FUELS GENERATION BY THE ARTIFICIAL LEAF

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It has been said for an ideal solar fuels process that the system requirements are:

- Earth-abundant materials
- No wires
- Direct solar-to fuels process.

We now describe two earth abundant catalysts that promote the oxygen evolving reaction (OER) and hydrogen evolving reaction (HER) with the light input mediated by an earth abundant silicon wafer, and all of this is done with no wires. The system captures many of the elements of photosynthesis and it is indeed functionally an artificial leaf. But the system surpasses the prescription from the community. It also does not rely on a membrane and it operates under very simple conditions, thus obviating complicated engineering requirements. The presentation concludes with a discussion of how to match the power curves of the catalysis and photovoltaic to achieve the most efficient artificial leaf.