nanostructured architectures and “artificial leaf” solar cells

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abstract

to convert sunlight to electricity dye-sensitized solar cells (dsscs) employ a strategy that is much like the first stages of photosynthesis, entailing light harvesting by strongly absorbing molecules, followed by fast electron transfer to a charge-transporting conduit. the best existing dsscs convert solar energy to electrical energy with about 11% efficiency – or about a third of what is theoretically achievable with cells of this kind. this talk will focus on: a) understanding what limits the efficiency, and b) illustrating how nanostructured molecular-dye architectures and semiconductor-electrode architectures might be used to circumvent these limits.

biosketch

a native of new york state, joseph hupp attended michigan state university for graduate work, completing a ph.d. in electrochemistry in 1983. from 1984 to 1986 he was postdoctoral fellow at the university of north carolina where he studied photochemistry. he joined the faculty of northwestern university in 1986, where he has built a research program in materials chemistry – especially materials that are relevant to our energy future. his work is described in more than 350 research articles. he currently holds the title of morrison professor of chemistry. he also holds an appointment as a senior science fellow in the materials science division at argonne national lab.

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