



Breakout Session I

Photon Capture & Charge Separation A

Wednesday, October 21, 2009

What are the most promising approaches to high efficiency photon energy capture that use earth-abundant elements? You should consider both efficiency (i.e. photon energy in to useable energy out) as well as deployability (resistant to photobleaching, oxygen degradation, water sensitivity, catalyst poisoning, etc).

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Requirements for photon capture/charge separation system:

Needs to absorb light over a significant portion of the solar spectrum

Needs to generate oxidizing equivalents for water oxidation

Needs to generate reducing equivalents capable of CO₂ reduction

Needs to minimize recombination

Must use earth-abundant elements

Must keep up with solar flux

Must be robust (or capable of self-repair)

Must maximize overall efficiency

Must lead to a scalable technology

Must maximize system simplicity and minimize cost

What are the most promising energy outputs from artificial photon capturing systems? Here, “most promising” means both highest efficiency (i.e. fraction of photon energy in delivered as useable energy out) and most likely to be integrated with a biological system.

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