



# **Breakout Session II**

## **Group C**

**Wednesday, October 21, 2009**

# Given the results of the first break-out sessions, what is the most promising approach to the development of an efficient, robust system capable of the production of direct-solar fuels, i.e. of harvesting photons and producing infrastructure-compatible high energy density liquid fuels in a single reactor?

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Technical Steps –

Take a systems approach to design an overall, scalable solar fuels reactor

Identify system components such as light harvesting, charge separation, and catalysts that are good candidates.

Identify methodologies to interface these components either in purely biological constructs, bio-hybrids, purely synthetic systems.

Focus resources on limiting bottlenecks in overall design and operation.

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## Major Challenges –

Use both synthetic and biological components in a hybrid system to take full advantage of their strengths and speak to the issue of scale-up (or not).

Thermodynamically and physically robust interface between components

How to get the most efficient reactor by reconciling one photon to one charged pair generation to multi-electron/proton catalysis

Optimize molecular bio-hybrid and biological assemblies combining catalysts with inorganic materials or semiconductors

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Potential –

The possibility of highly productive and favorable emergent properties being developed by combining components from today's available biological and/or synthetic photosystems and catalysts is very high and should be vigorously pursued.