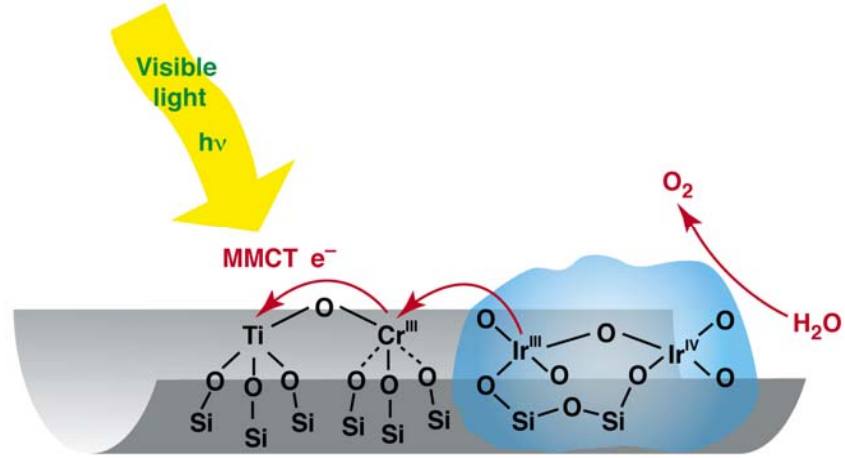
Approach for CO_2 + H_2O to liquid fuel conversion by sunlight: Well-defined polynuclear photoactive components arranged in robust 3-D nanoporous scaffold

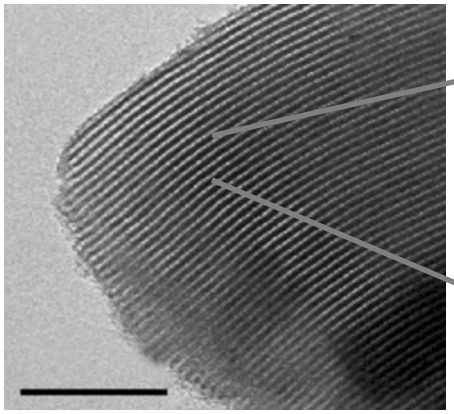
Heinz Frei, LBNL

Goal:

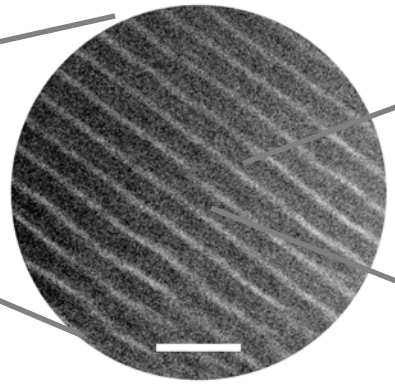
$$CO_2 + H_2O \rightarrow CH_3OH + O_2$$

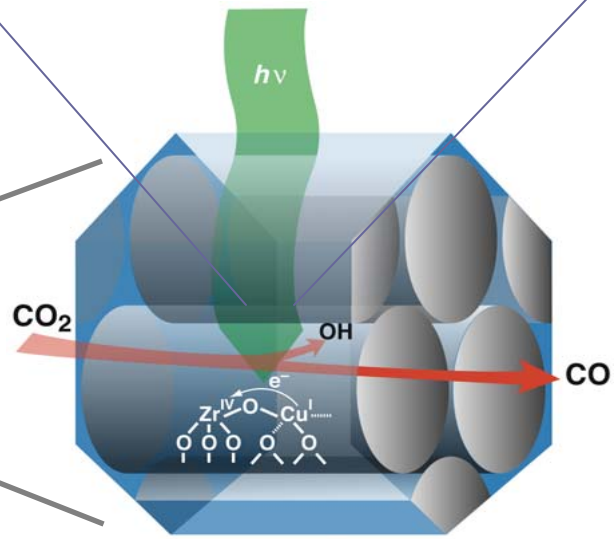


nanoporous silica support



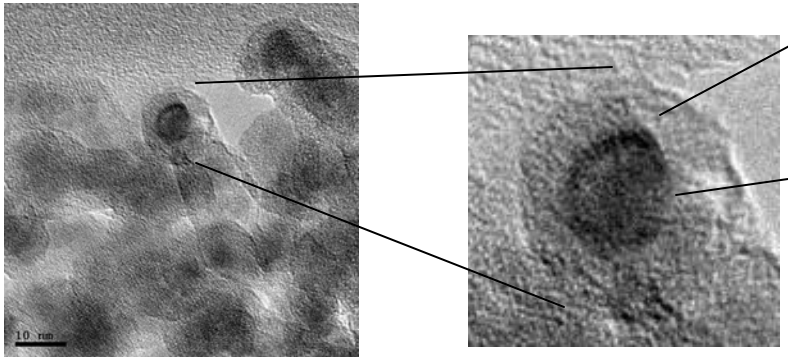
200 nm





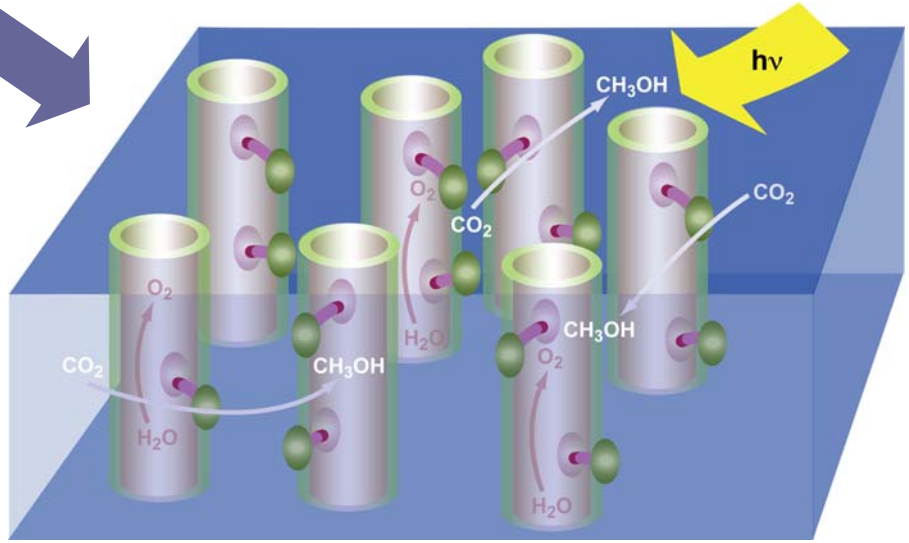
Integrated System

Mn oxide core/ silica shell construct



silica shell

Mn_3O_4 core



Silica nanotube array asymmetrically functionalized with photocatalysts for CO_2 reduction and H_2O oxidation