

Noves formes de produir hidrogen amb recursos renovables i nous usos

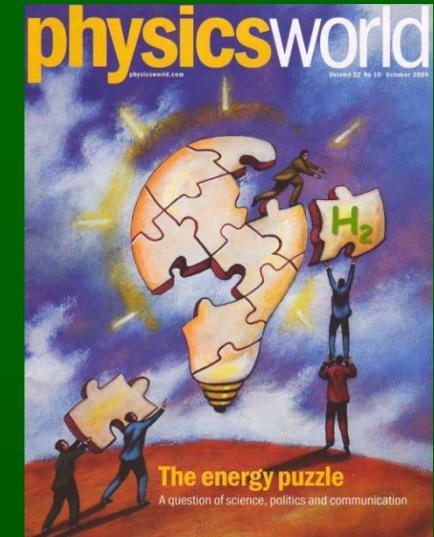
Jordi Llorca

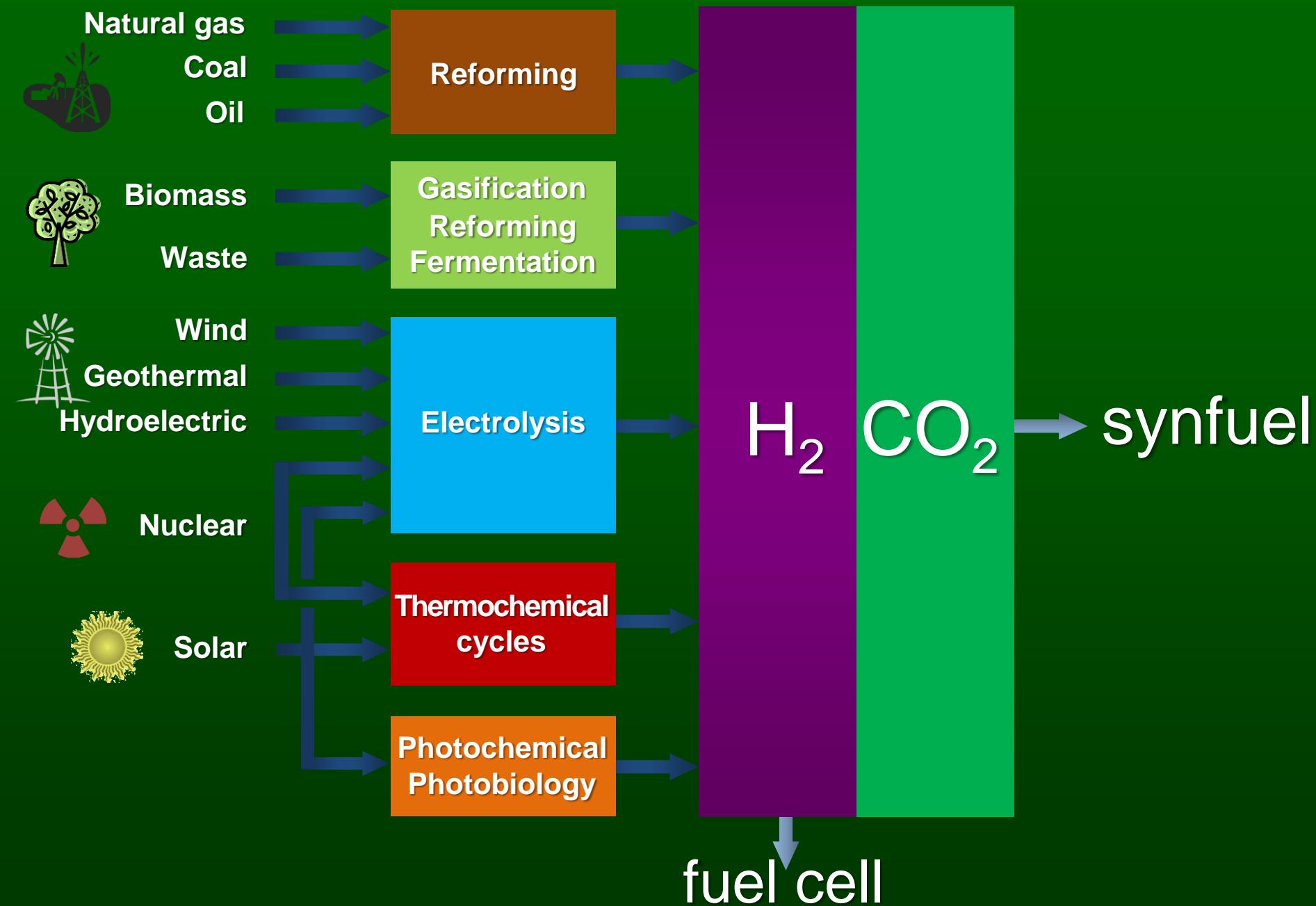


Institut de Tècniques Energètiques

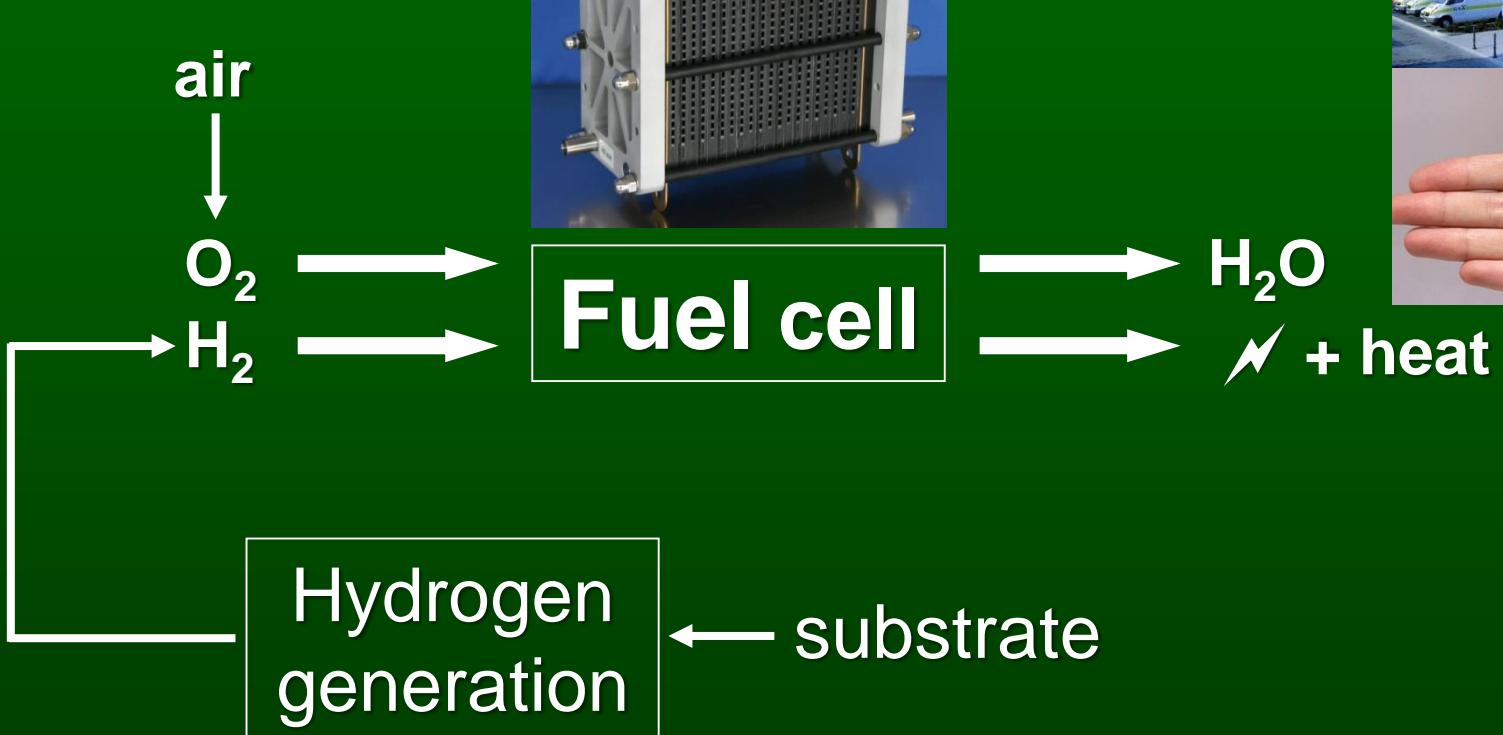
Hidrogen:

- ❖ Emmagatzemar energia
- ❖ Sense emissions
- ❖ Piles de combustible: $E_{\text{química}} \rightarrow E_{\text{elèctrica}}$
- ❖ Vector energètic versàtil
- ❖ P2G

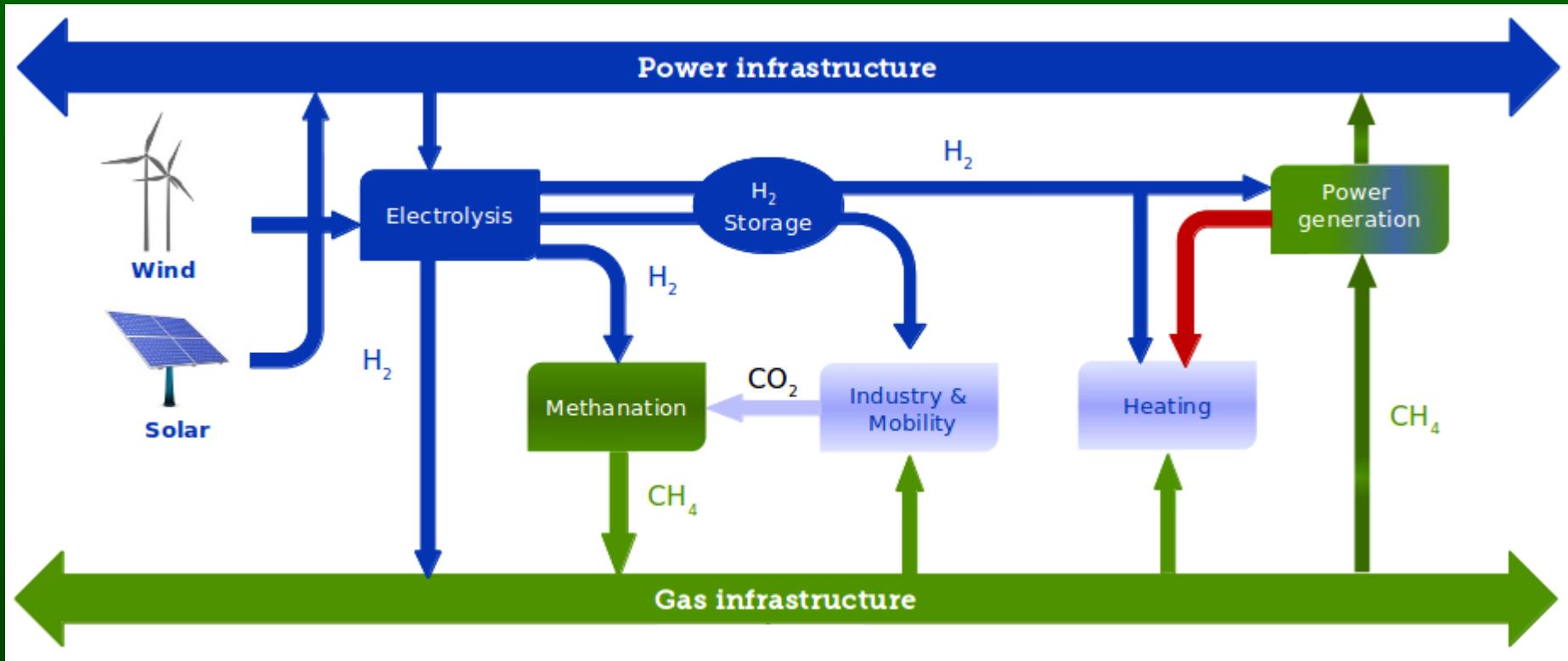




Hidrogen i gas de síntesi:

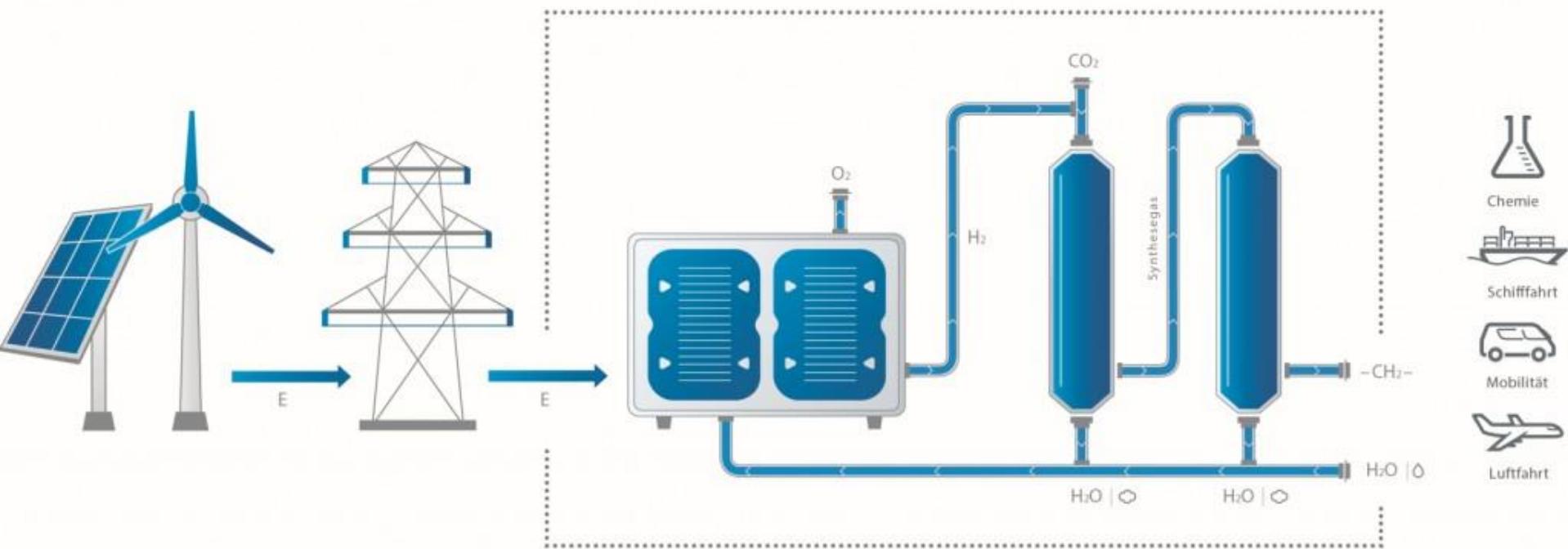


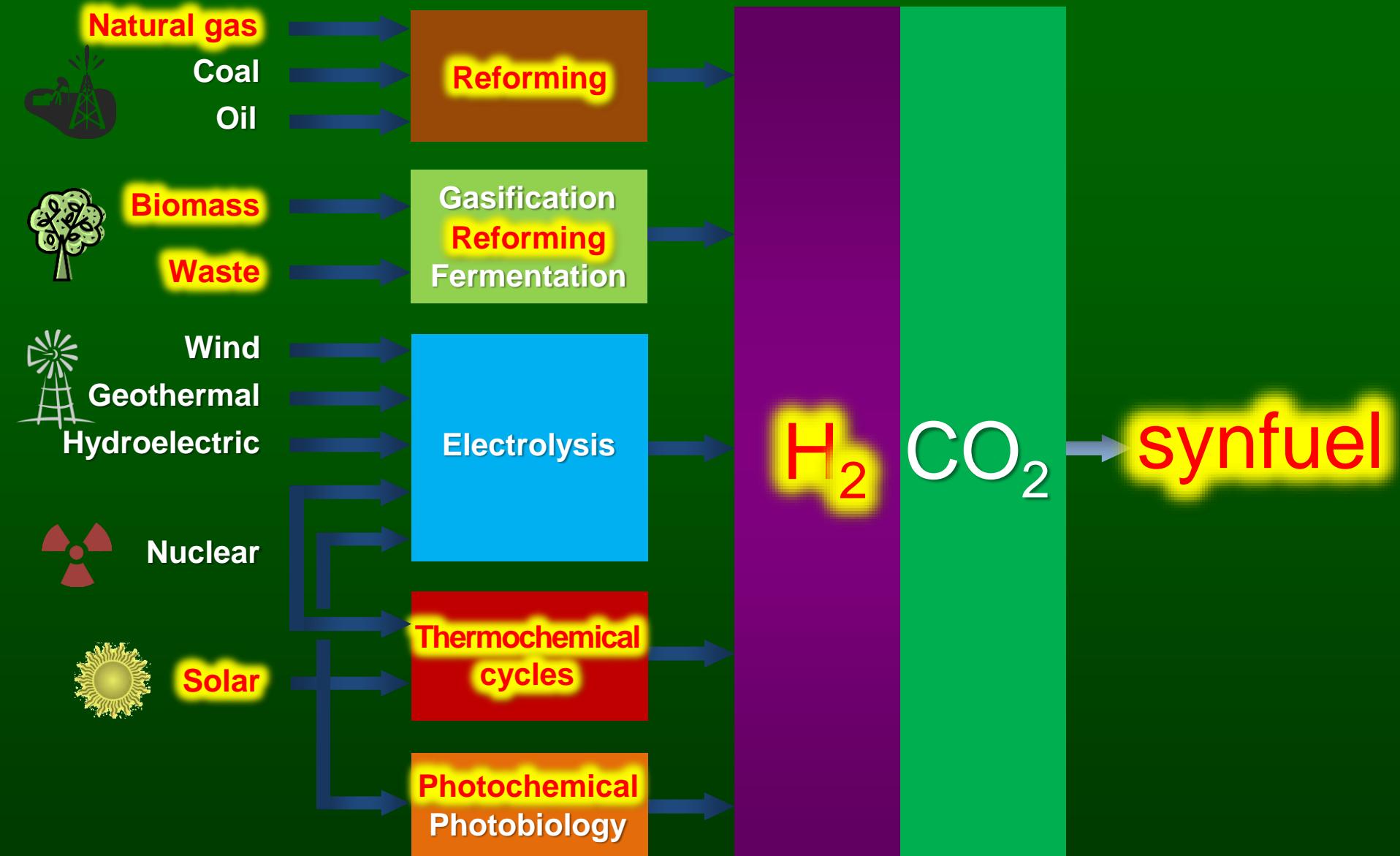
Power to gas: P2G

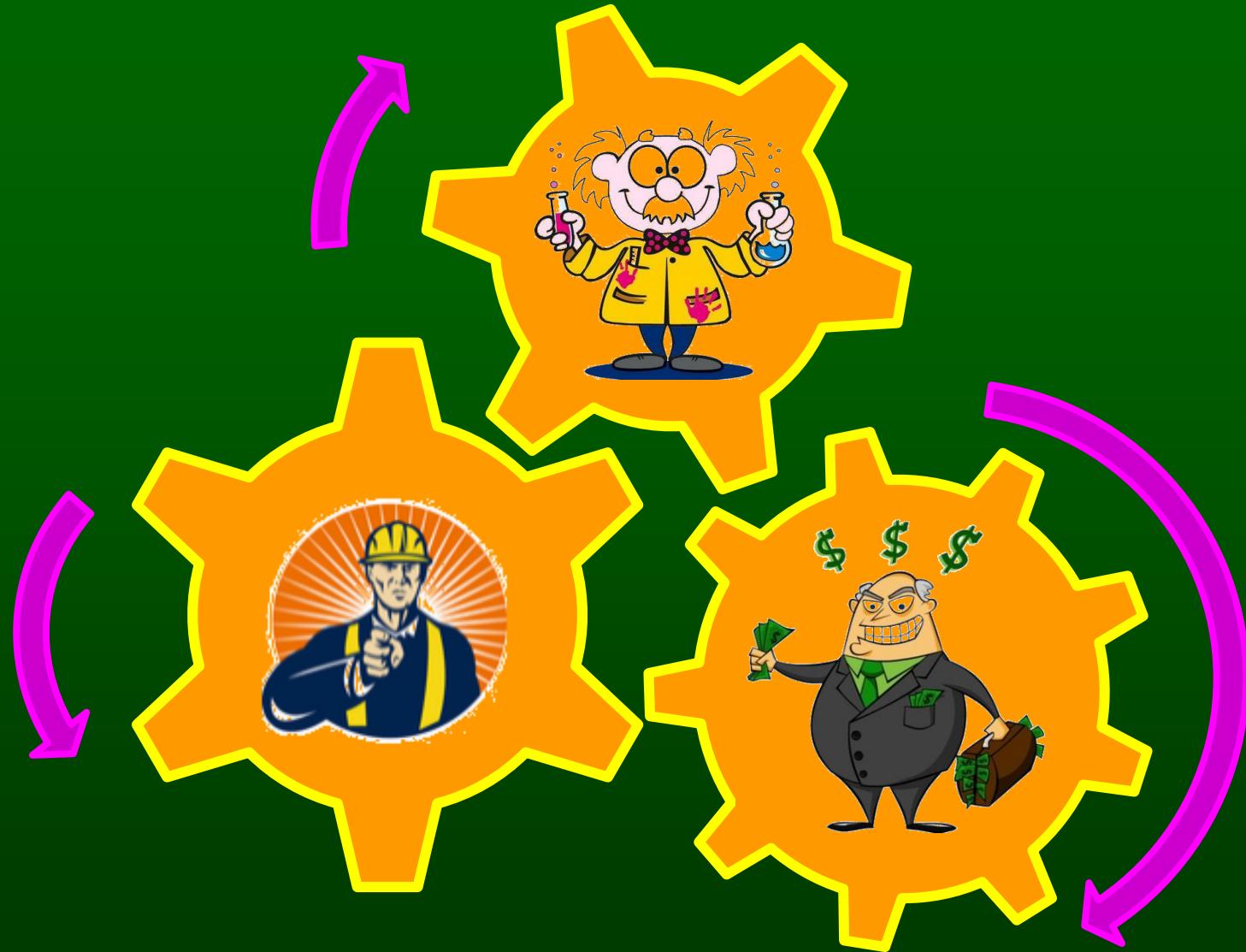


Power to liquids: P2L

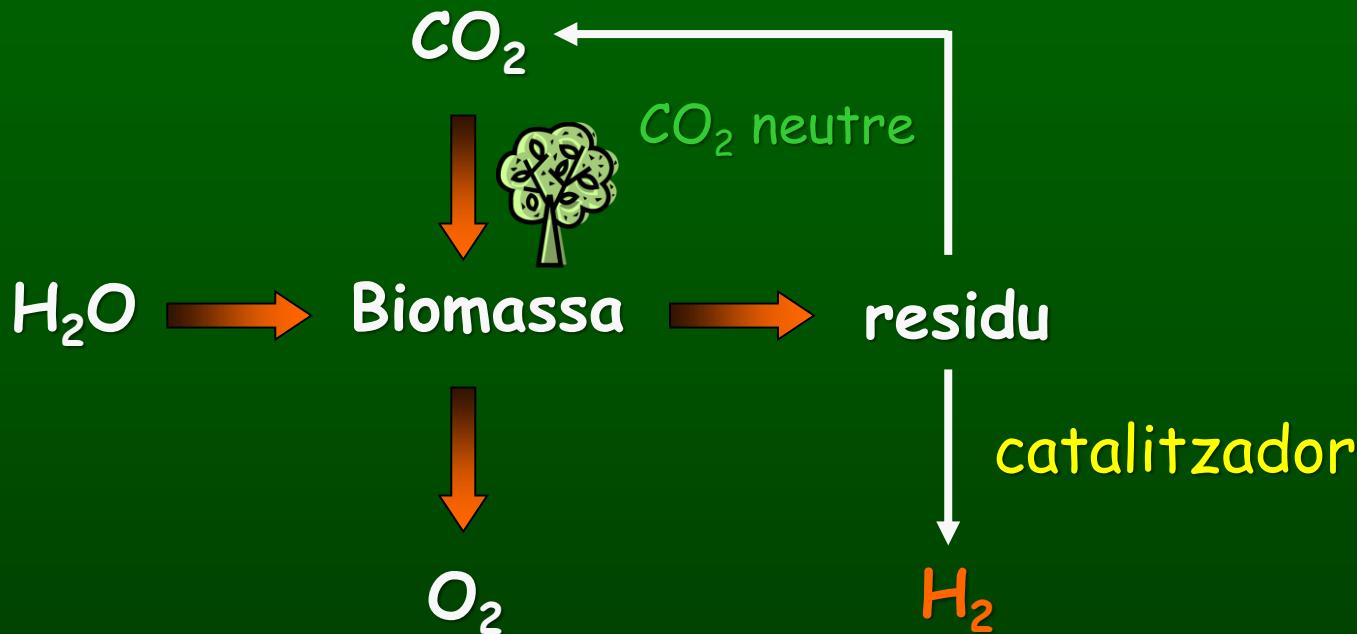
POWER-TO-LIQUIDS





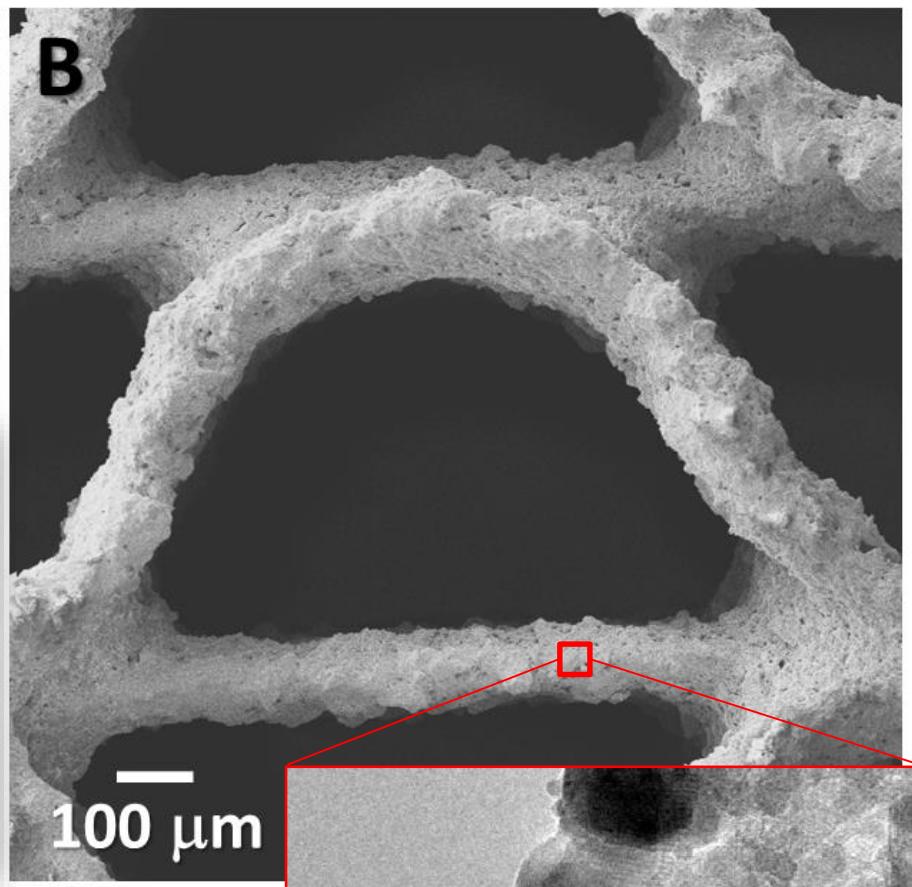
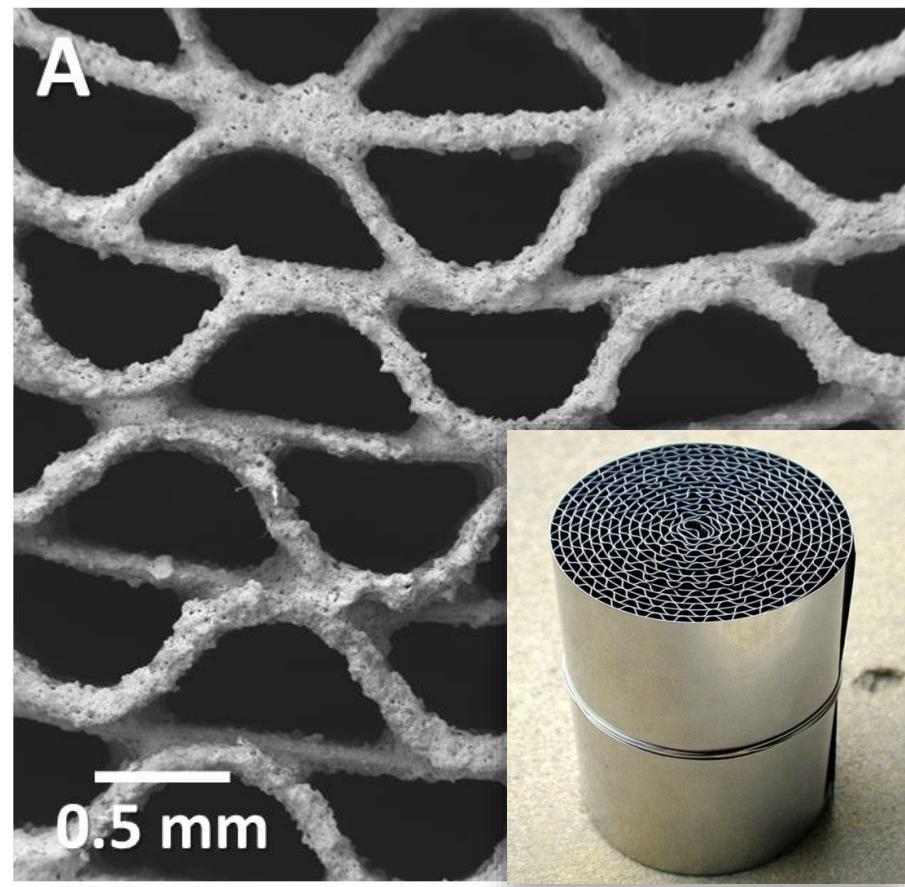


Reformació catalítica de residus:



Bio-etanol:





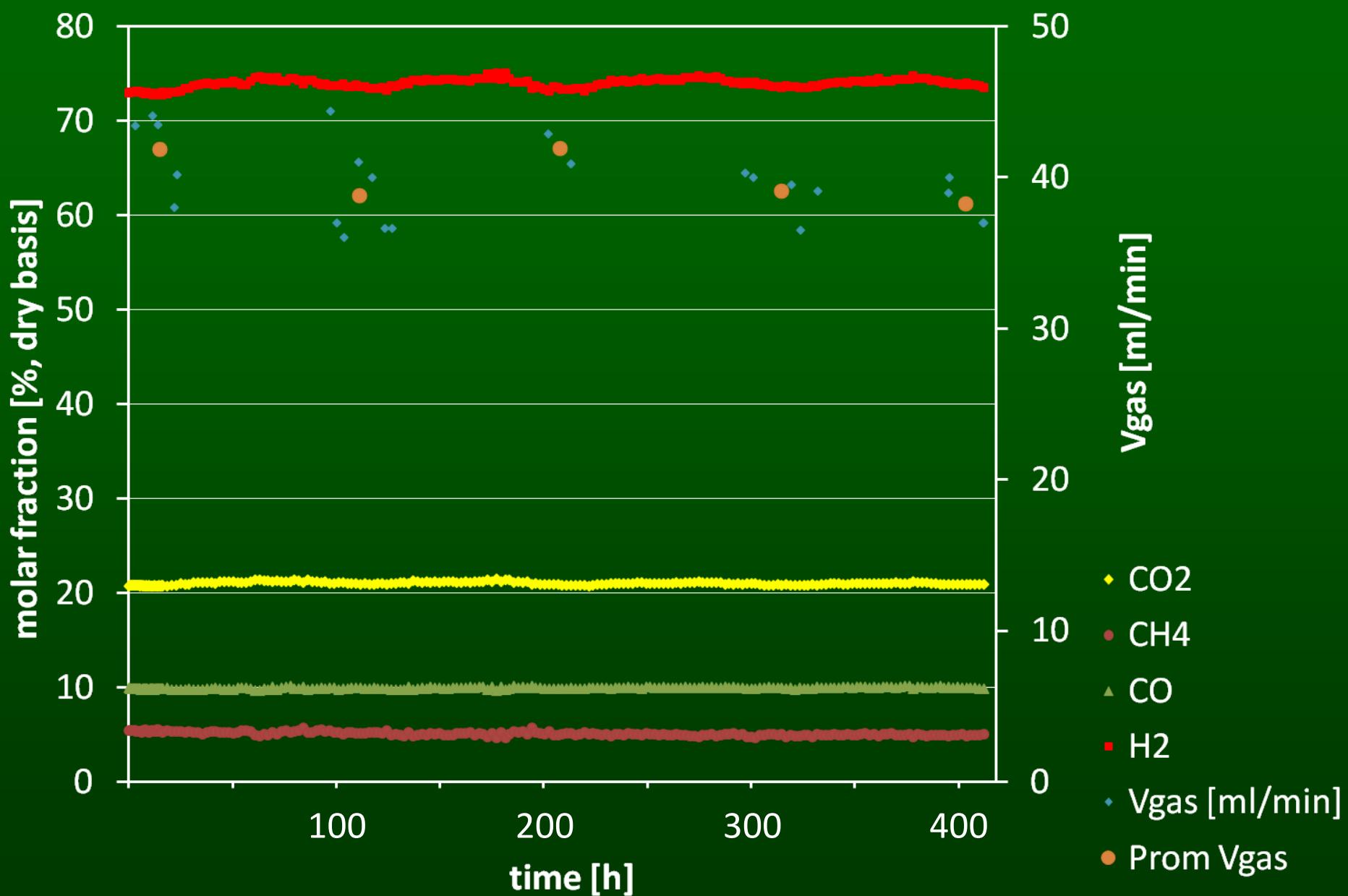
Catalitzador:

actiu (eficient)

selectiu (sense subproductes)

robust (estable)

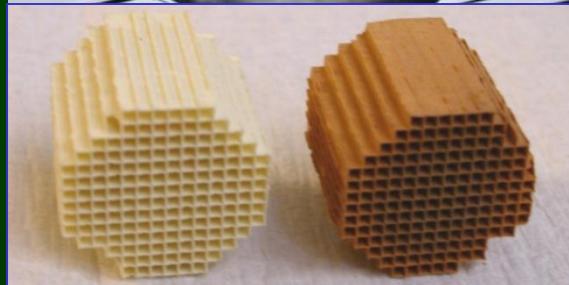
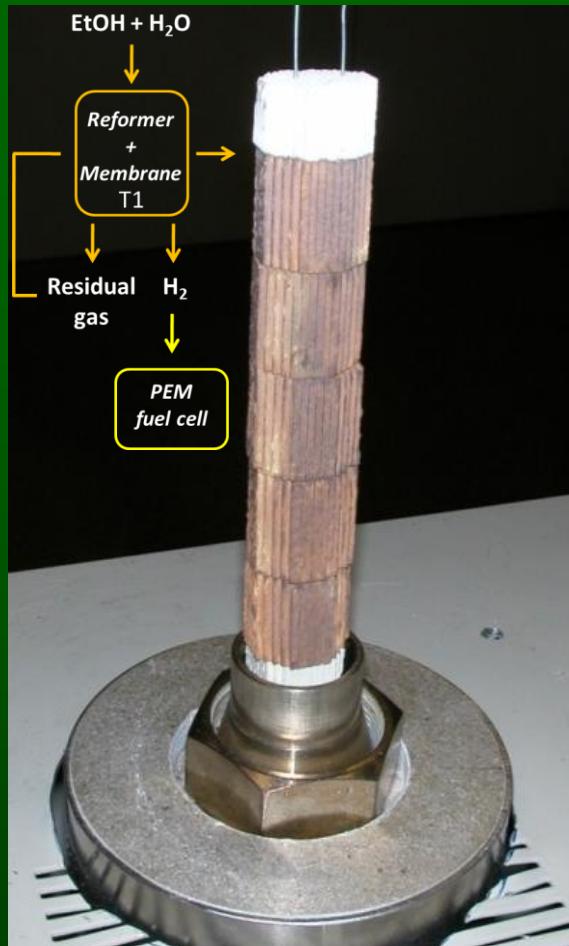
$677\text{ }^{\circ}\text{C}$, 4.5 bar, S/C=3, $0.05\text{ ml}_{\text{liq}}\cdot\text{min}^{-1}$



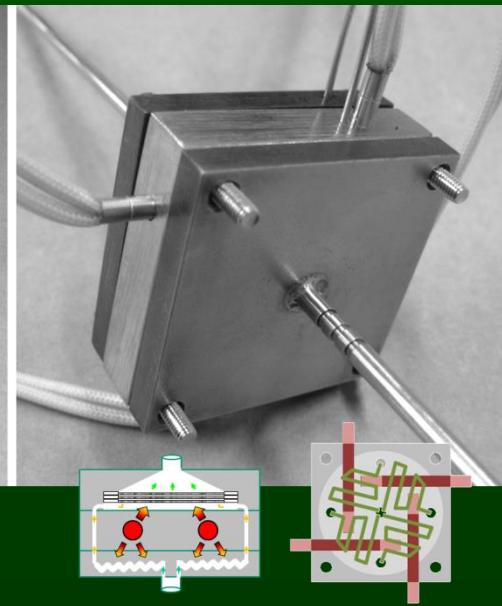
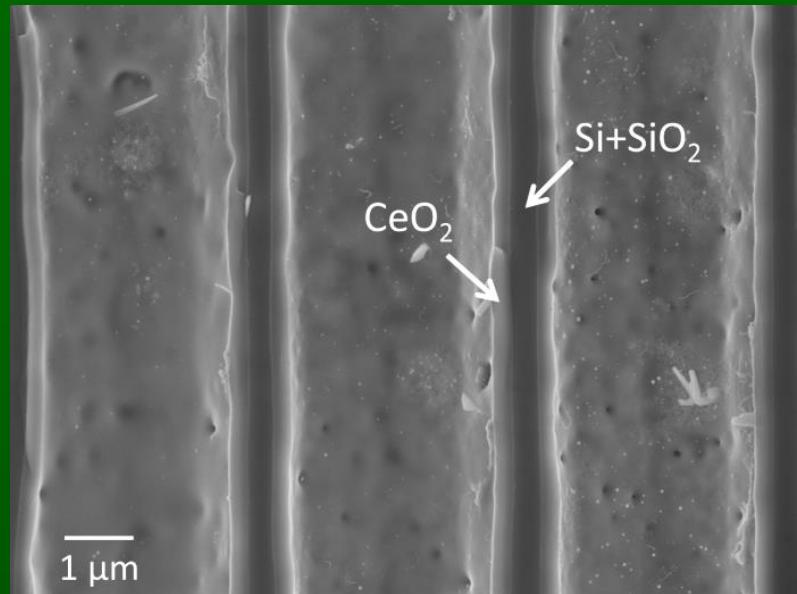
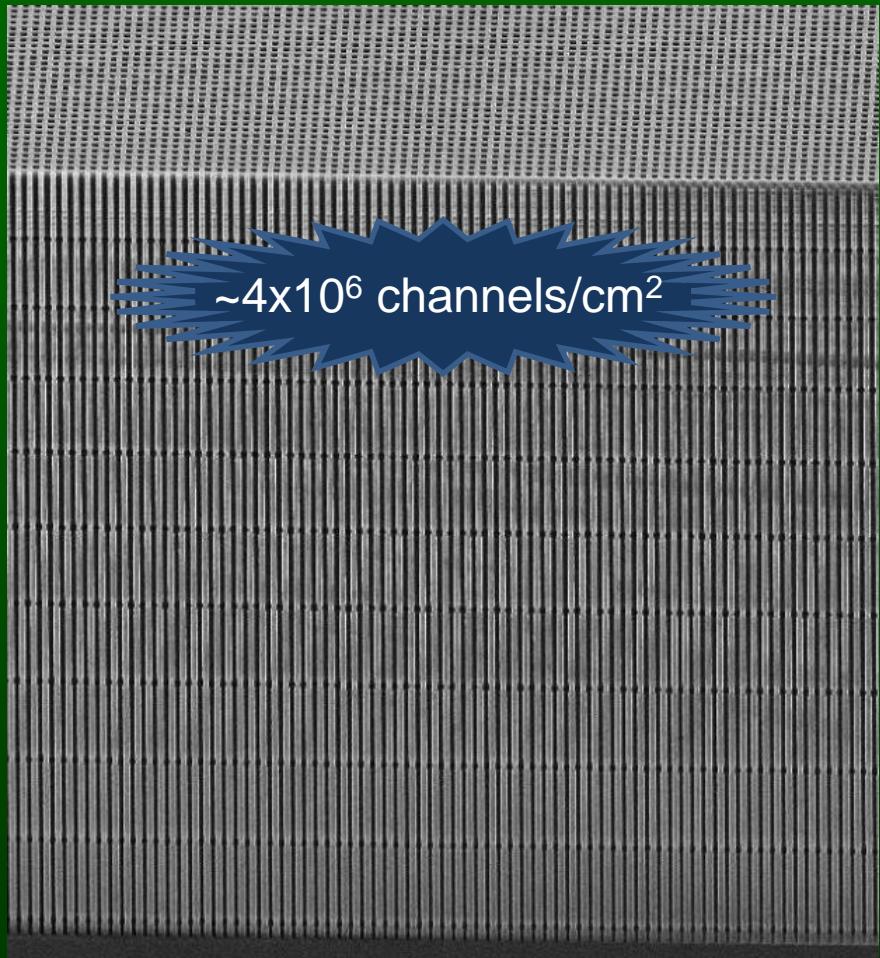
Microreactors d'acer:



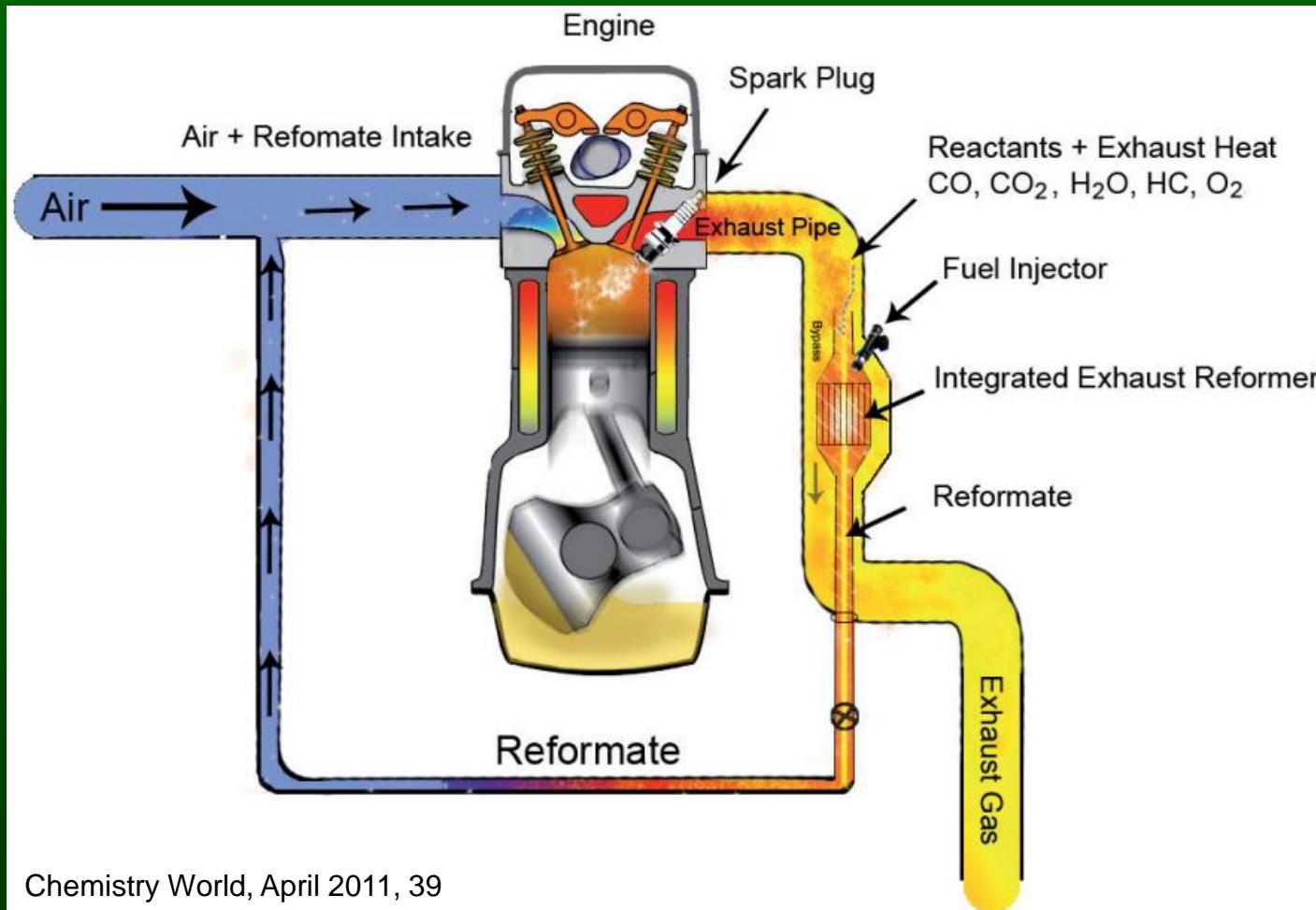
Reactors de membrana:



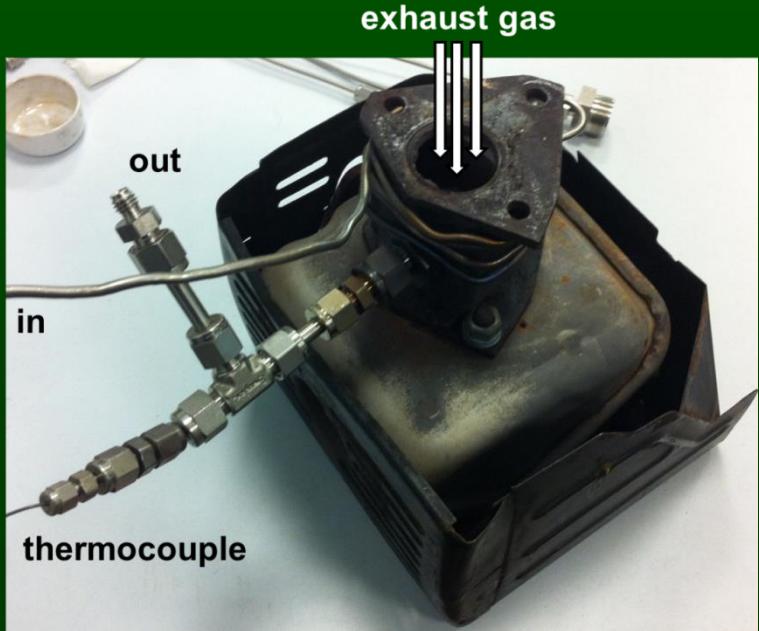
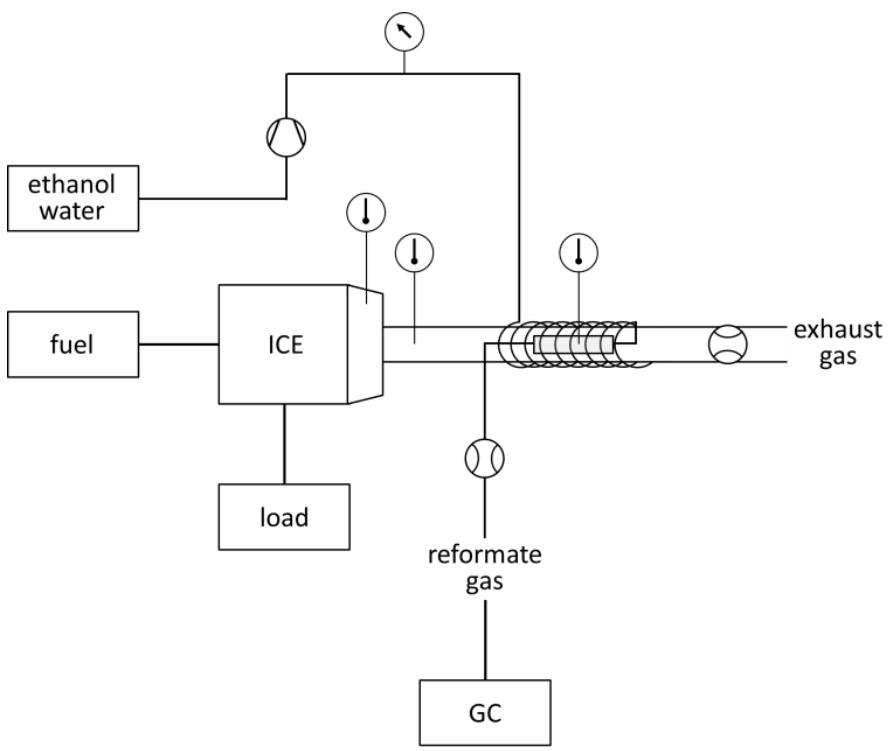
Microreactors de silici:



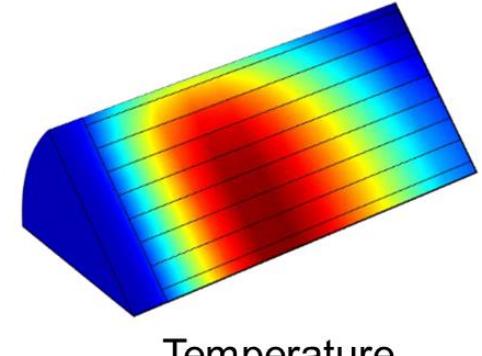
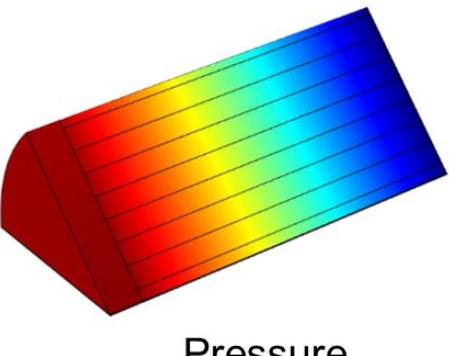
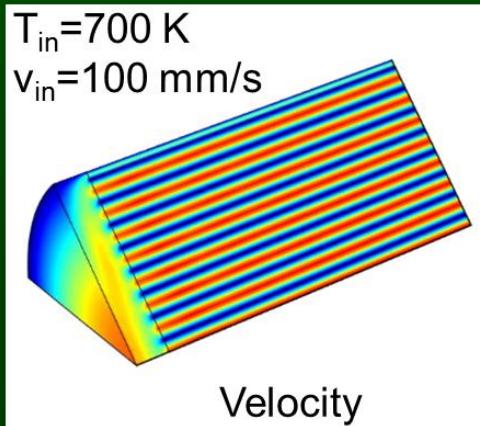
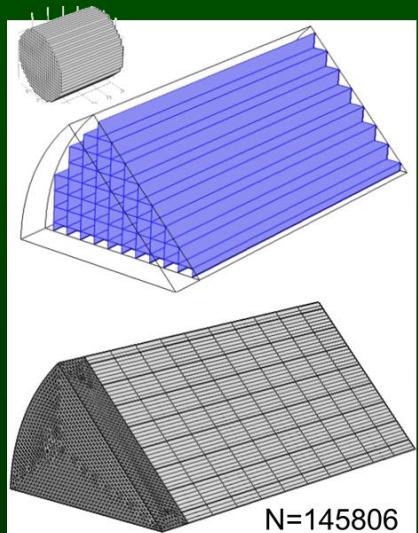
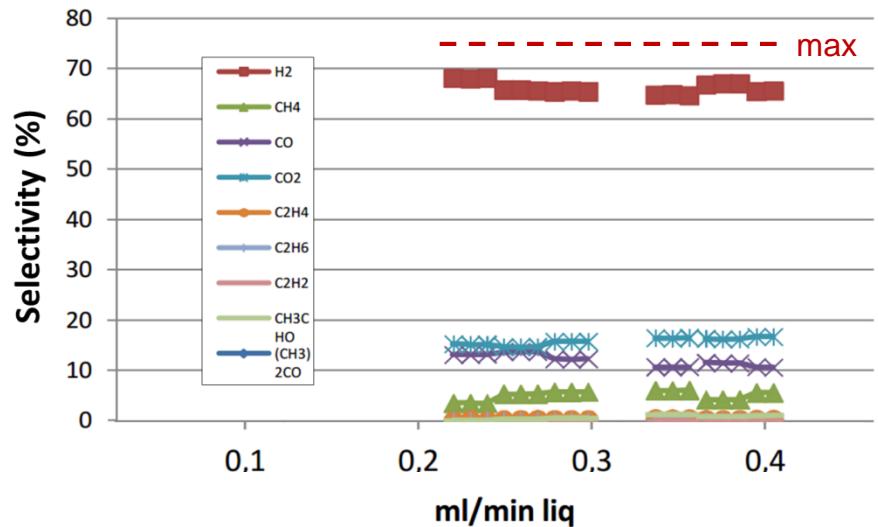
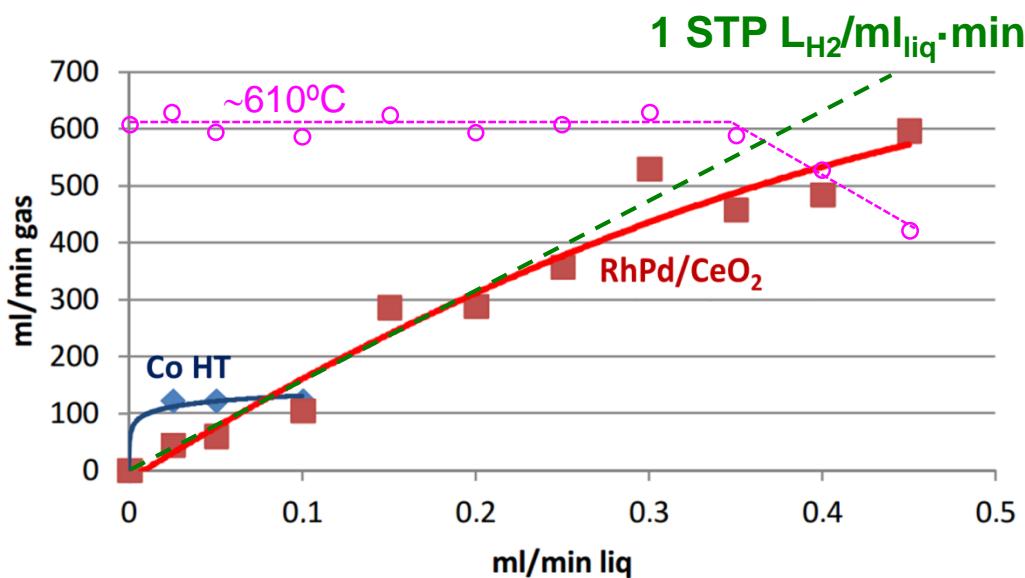
Aprofitament dels gasos residuals dels motors de combustió:



Chemistry World, April 2011, 39

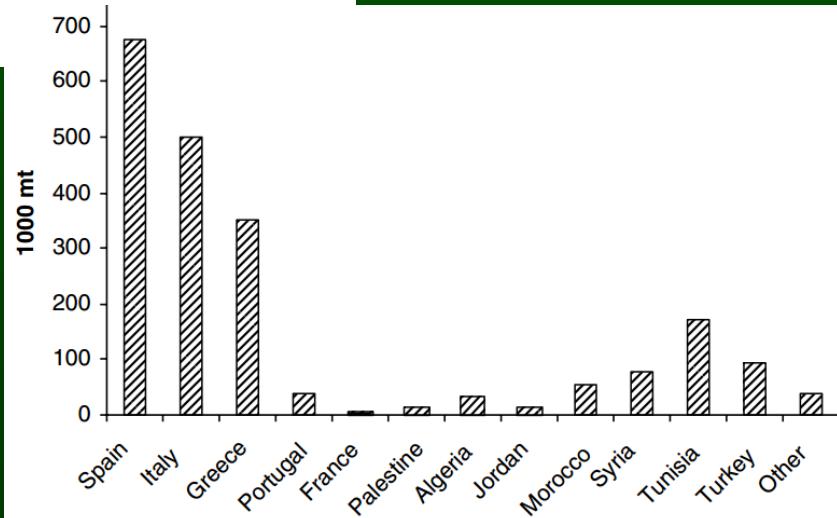
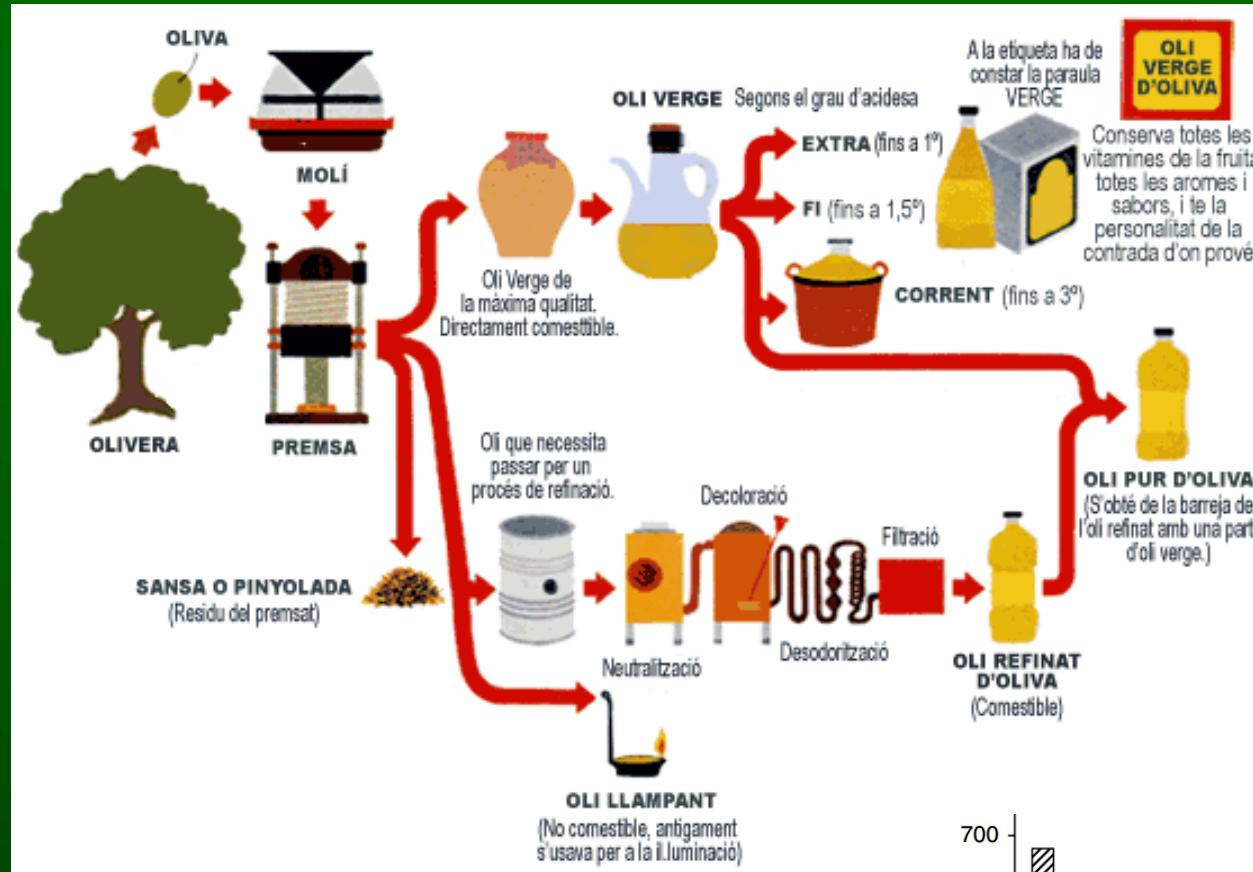


Bio-etanol, S/C=6, $\tau \sim 0.2$ s

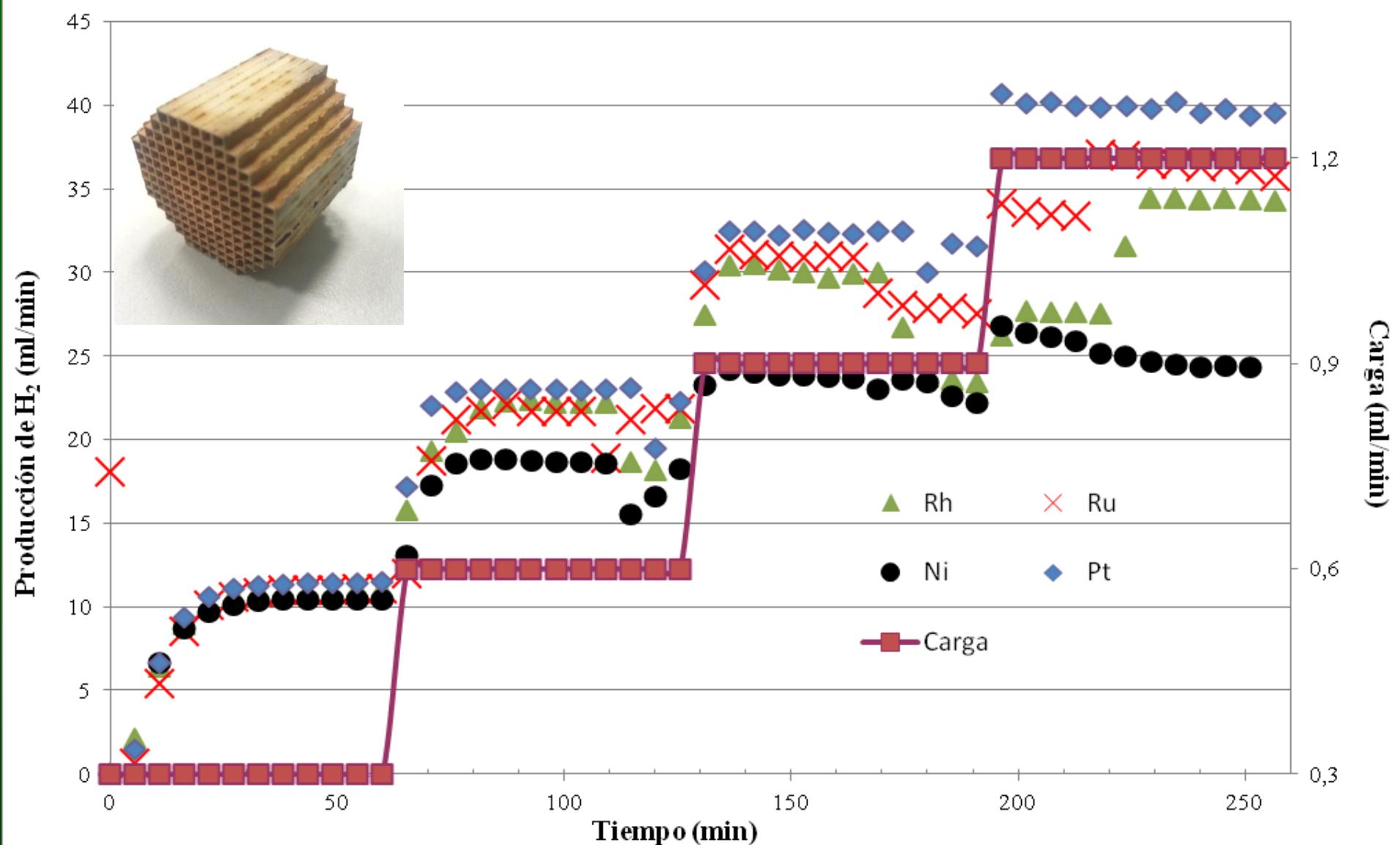


Indústria de l'oli d'oliva:





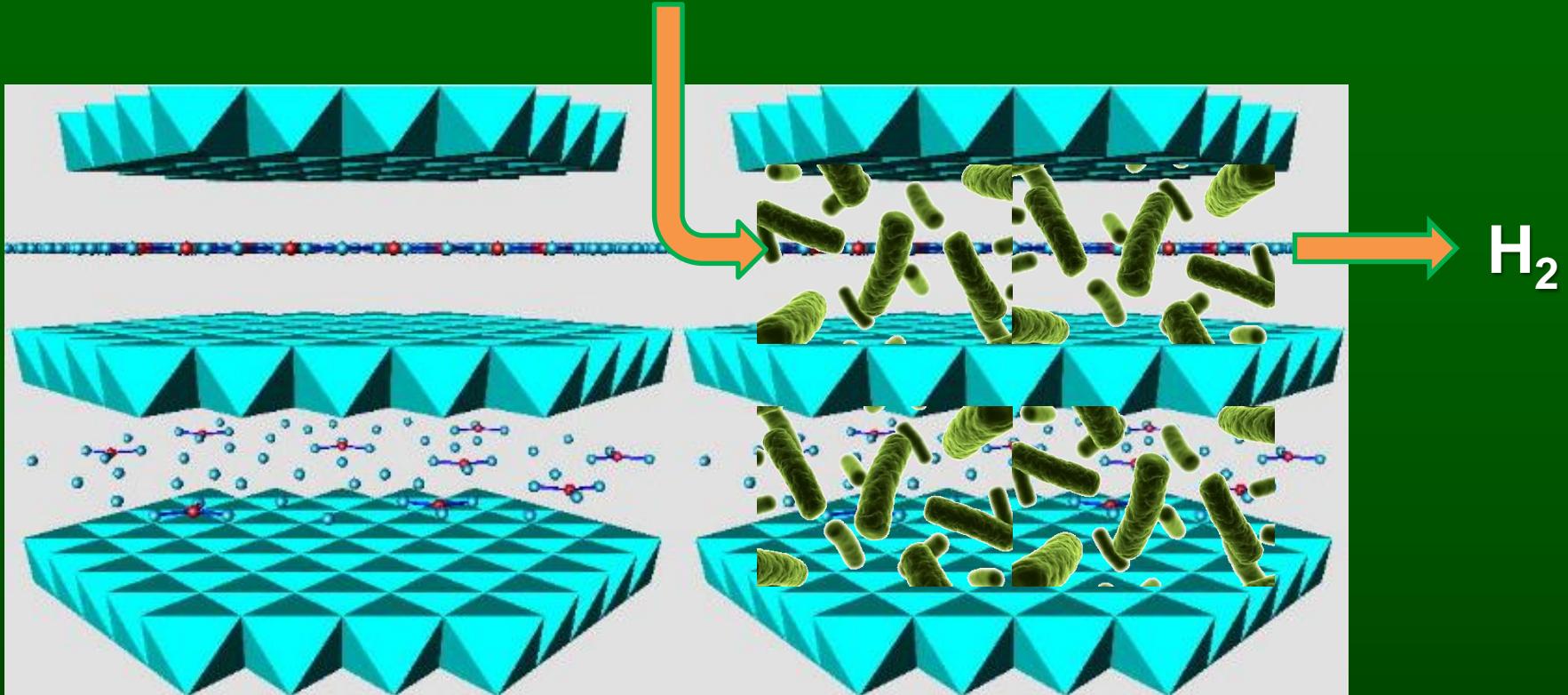




Bio-hidrogen (microorganismes):



Residu indústria alimentària

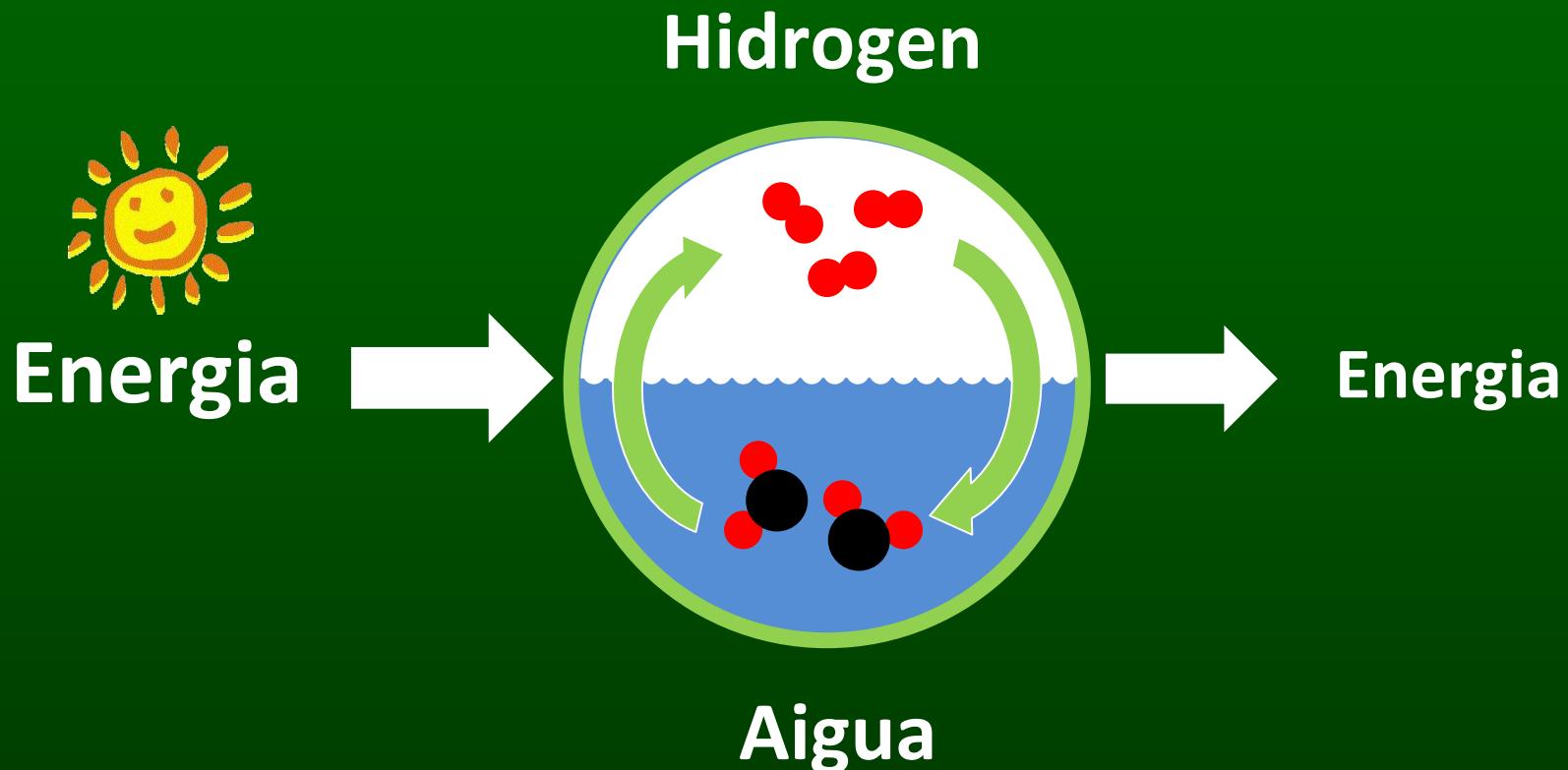


argila

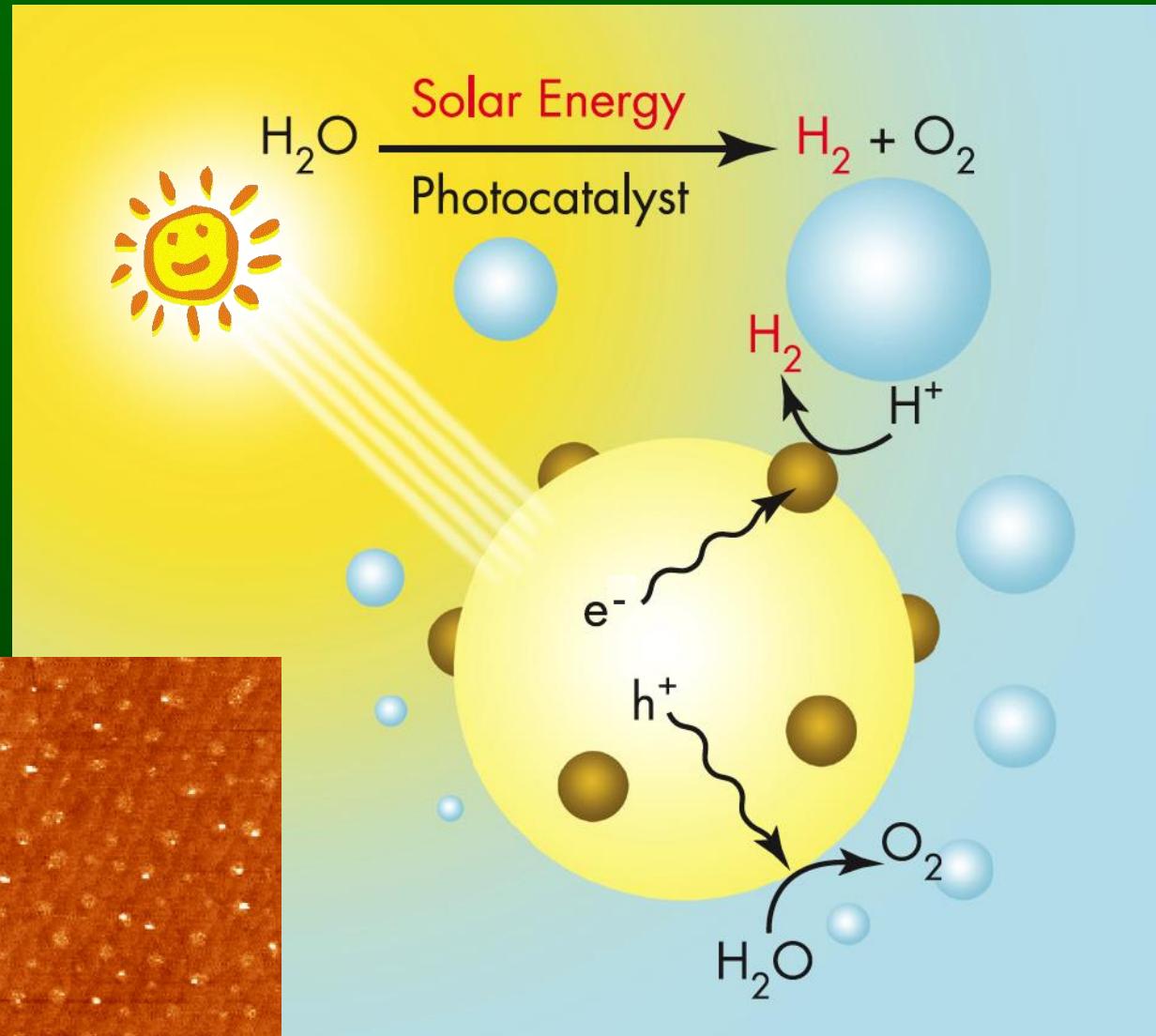
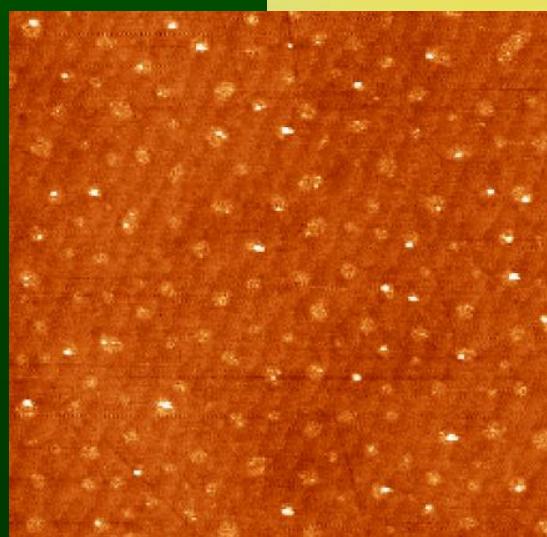
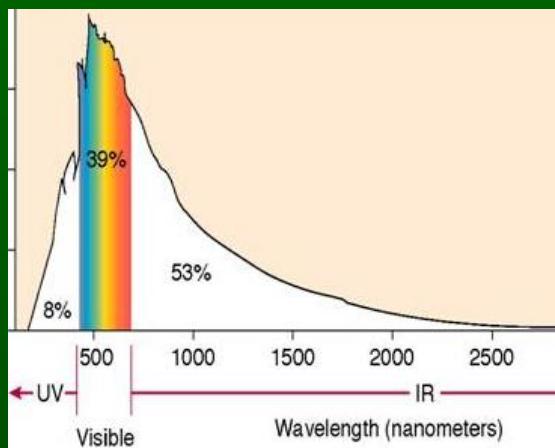
2.4 mol_{H₂}/mol_{sucrosa}

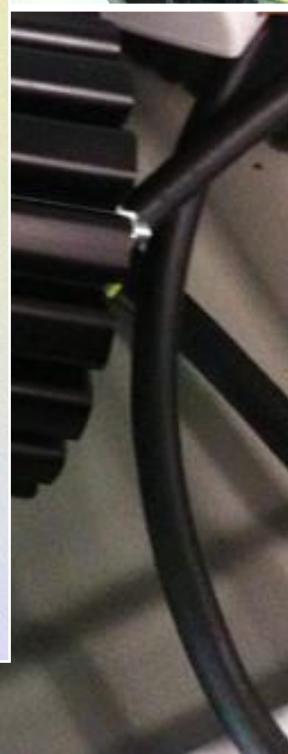
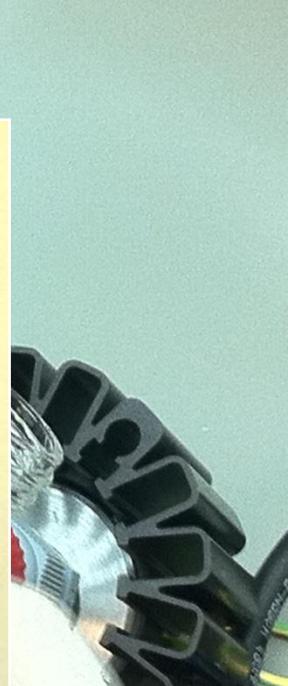
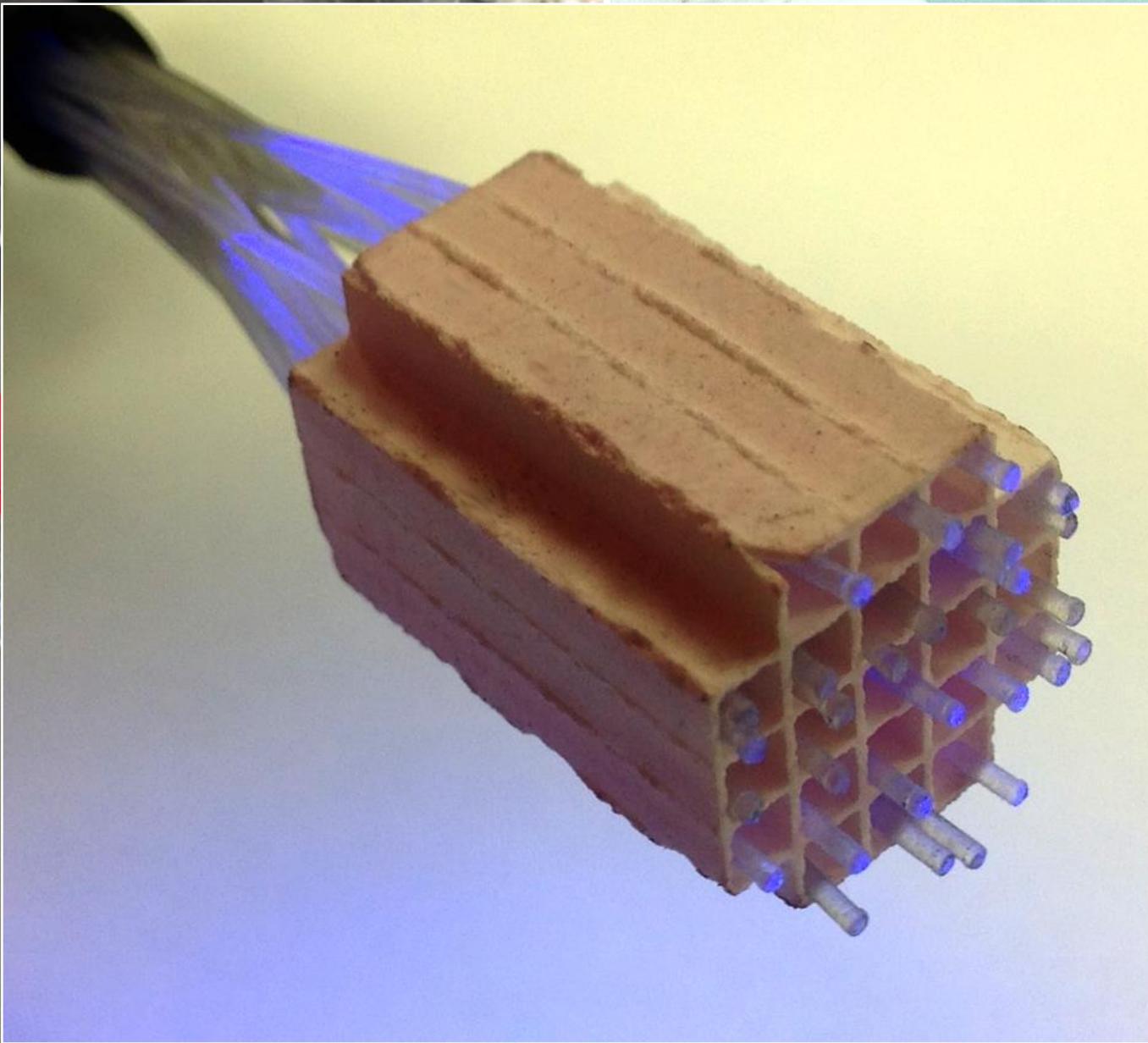


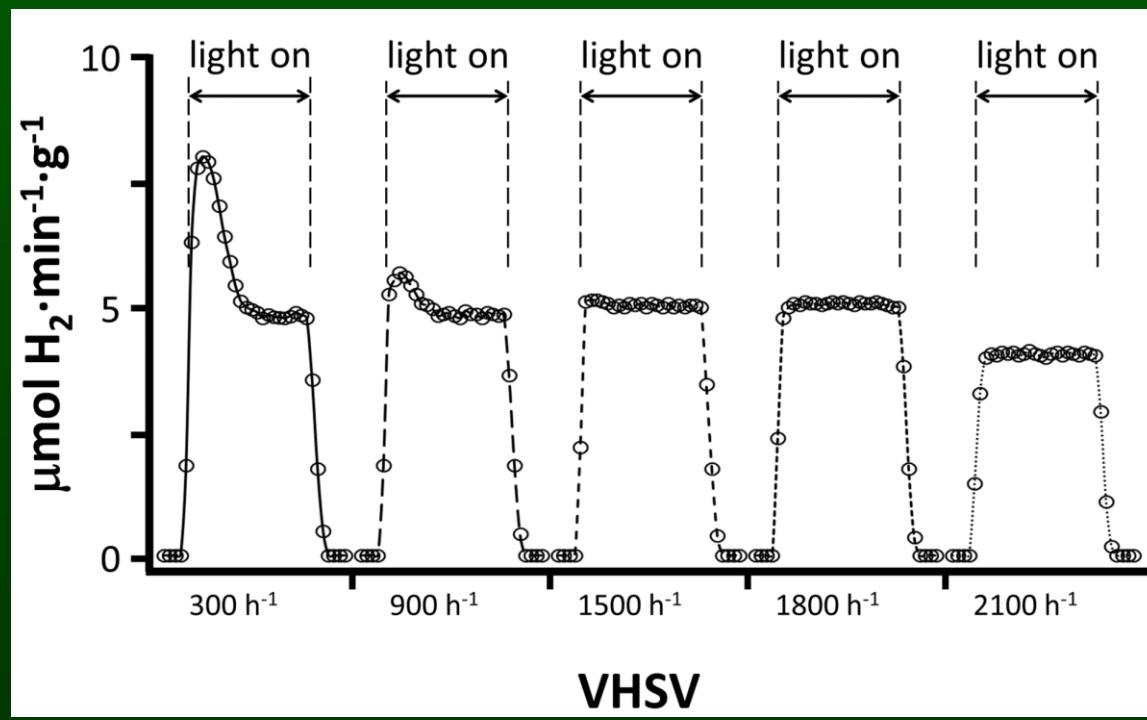
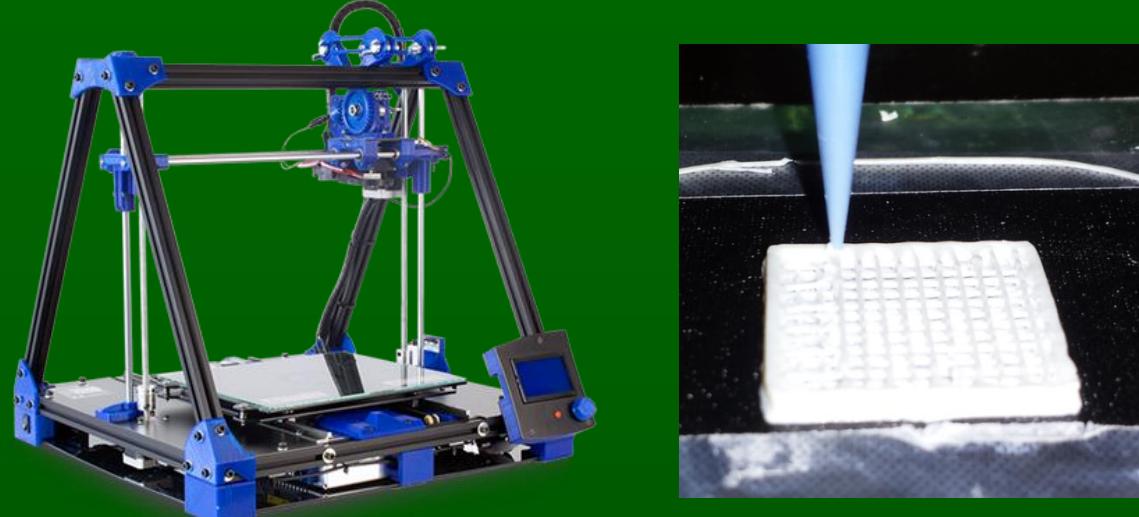
El somni...

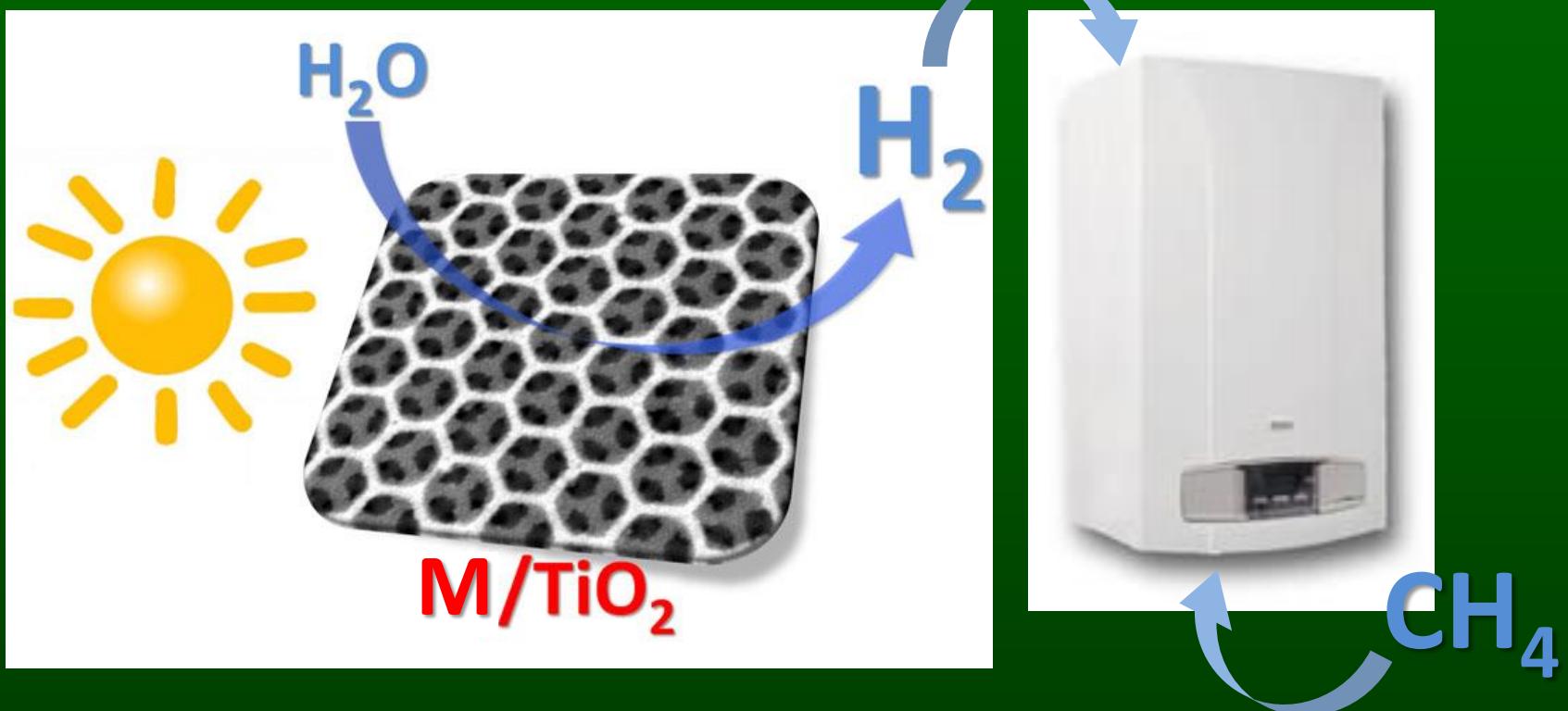


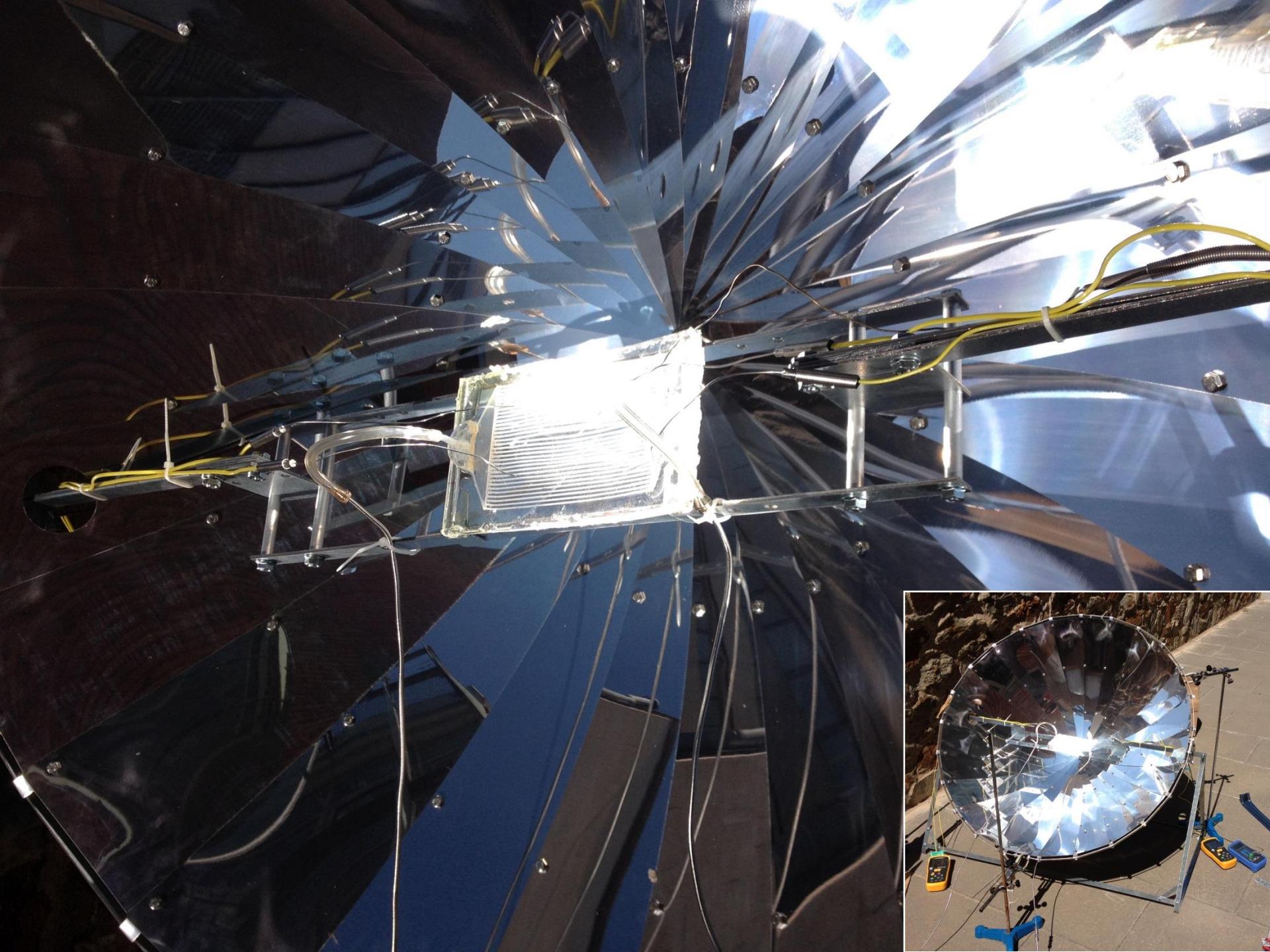
Fotocàtasis:











Resum:



- Amb hidrogen i CO₂ podem comunicar les xarxes elèctriques i de gas natural
- Podem fer hidrogen amb residus agrícoles i industrials.
- Podem fer hidrogen a partir dels gasos residuals dels motors de combustió i reinjectar-lo
- Podem fer hidrogen a partir de l'aigua amb la llum del Sol



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EEBE

