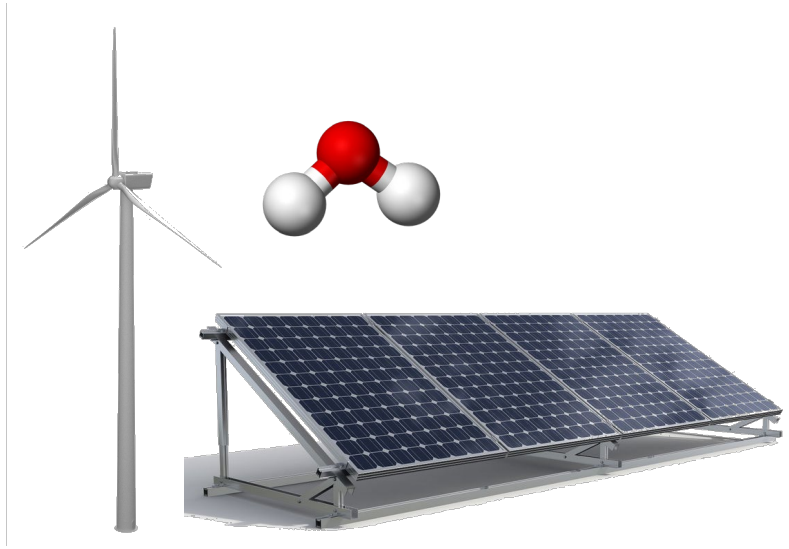
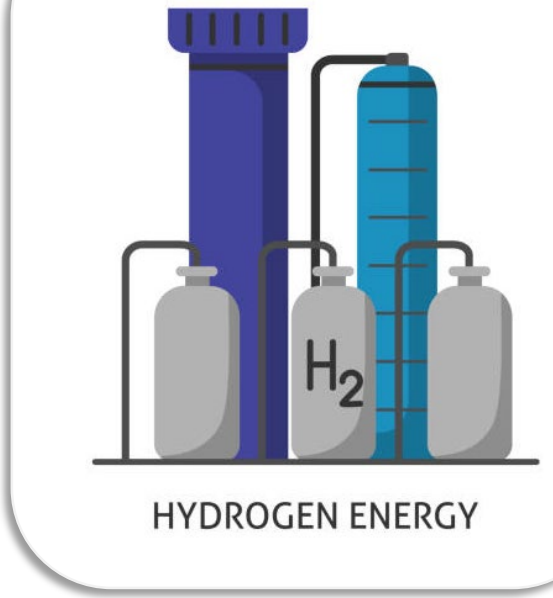
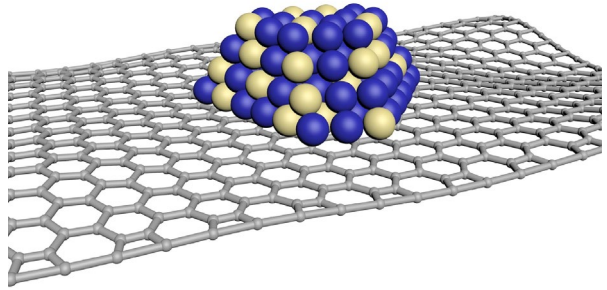
The promise of electrochemical water splitting

Storing energy from renewable sources in chemical bonds





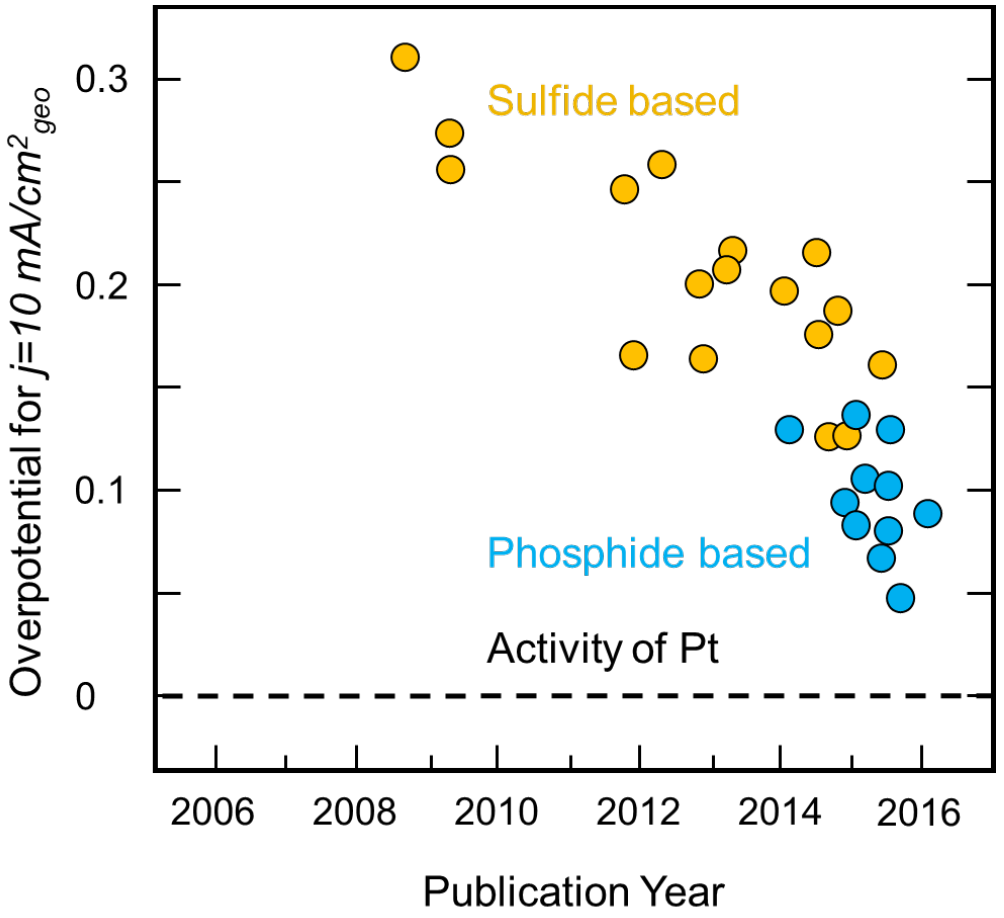
Electrochemical water splitting requires effective electrocatalysts



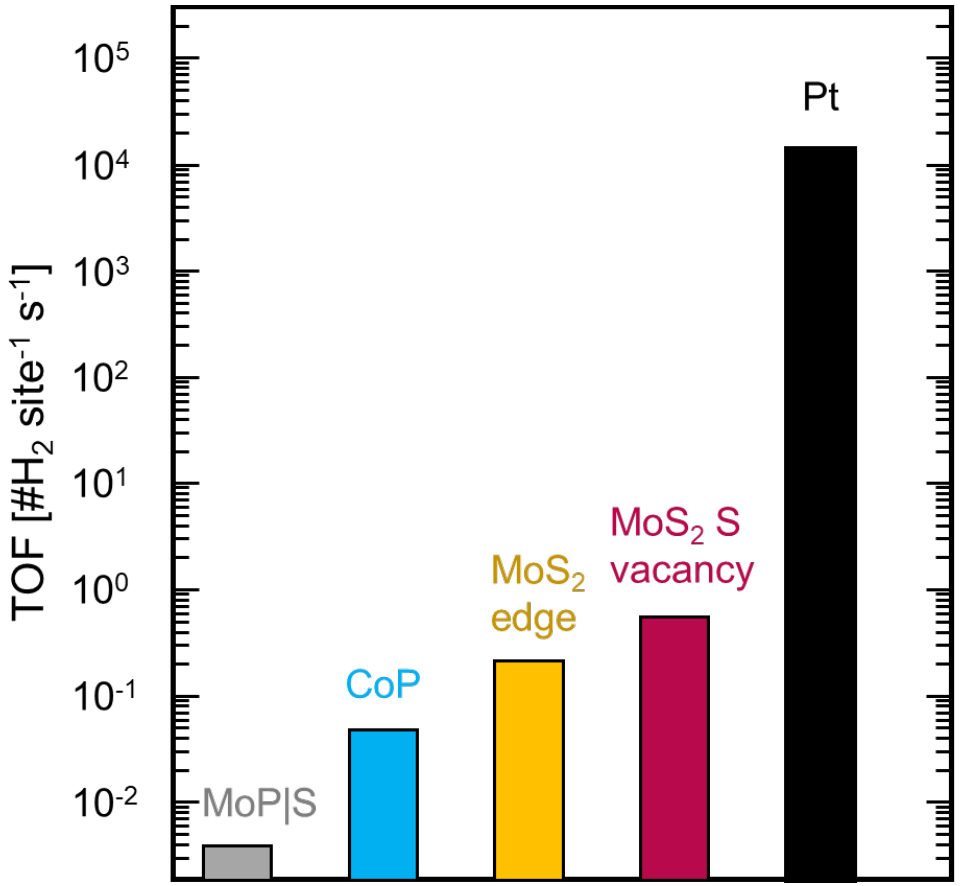
Resasco, Bell *Trends in Chemistry* **2020**

Better catalysts are needed for green H_2 production

Precious metal catalysts are still >1000x more active than earth abundant catalysts for hydrogen production



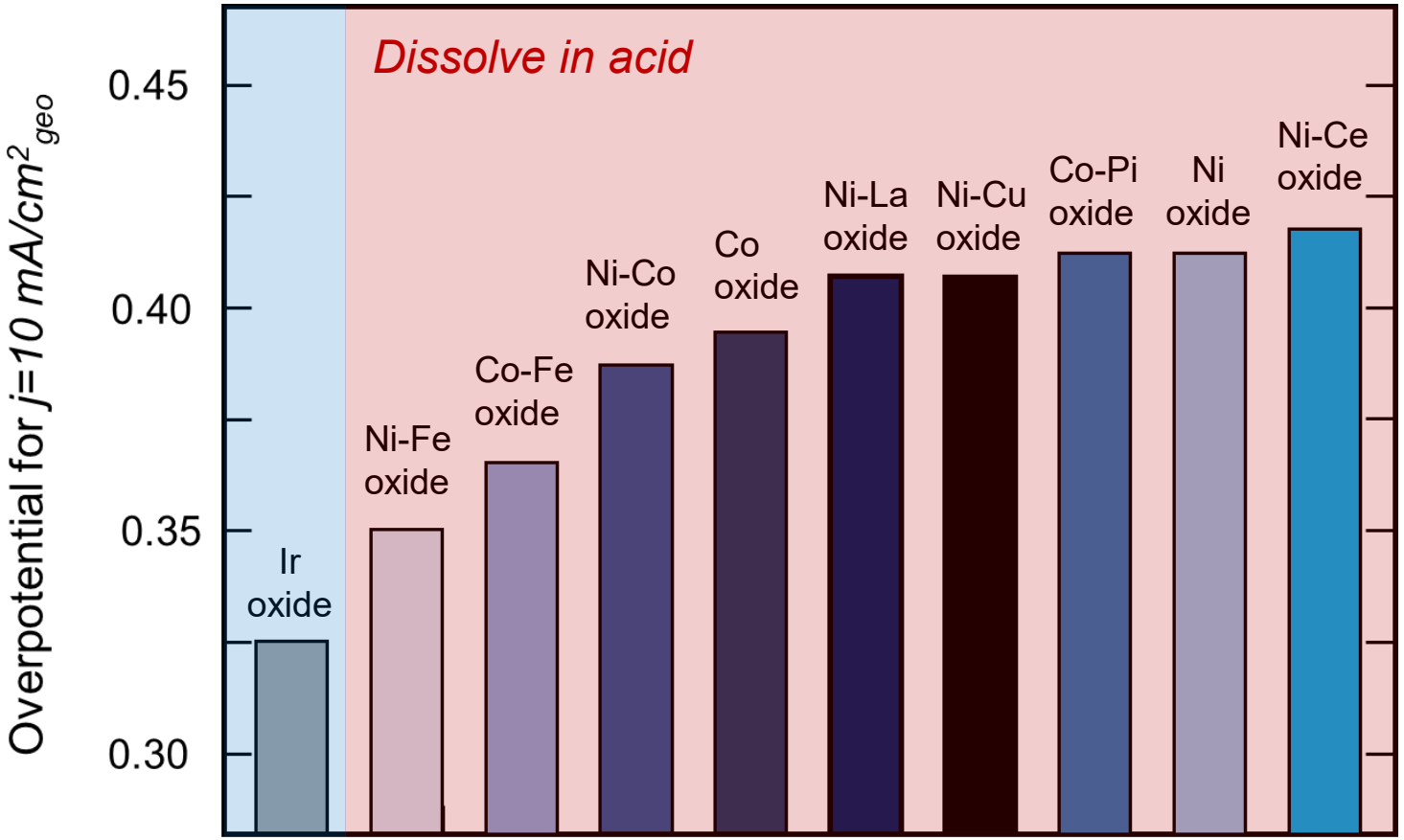
Seh, Jaramillo et al. *Science 2017*



Chorkendorff et al. *ACS Energy Lett. 2021*

Better catalysts are needed for green H_2 production

For oxygen evolution, all catalysts are lower in activity
Only precious metal catalysts are stable in acidic conditions

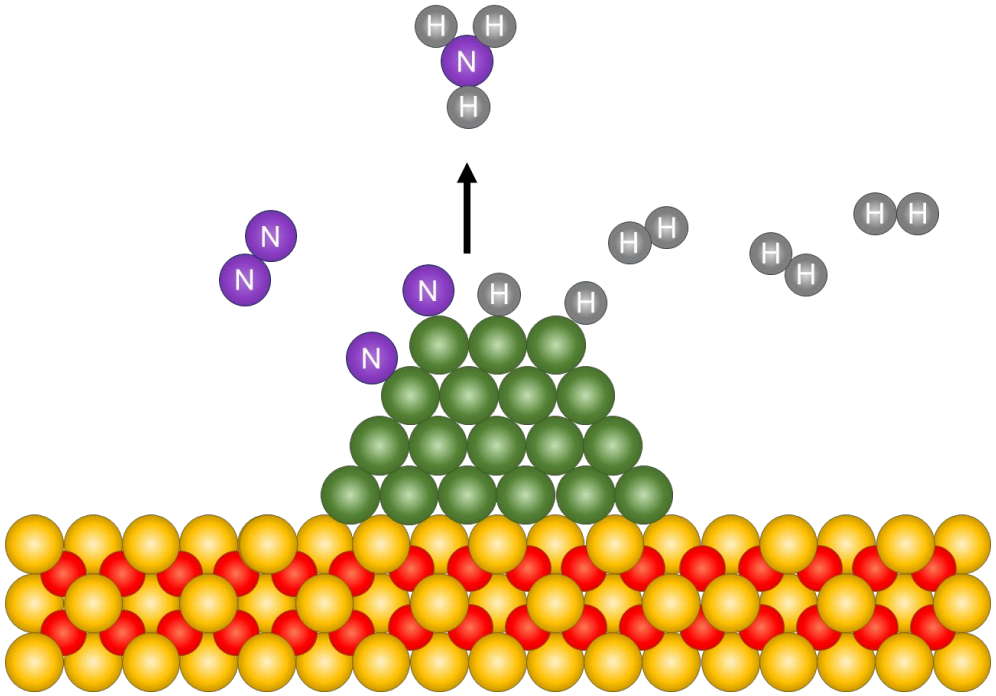


McCrory, Jaramillo et al. *J. Am. Chem. Soc.* **2013**

Catalysis has a role in hydrogen storage and use

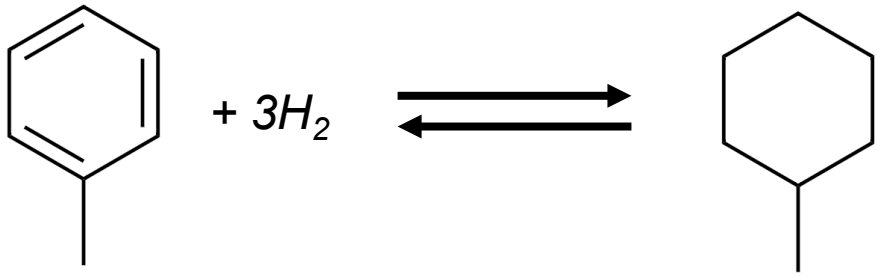
H_2 is used in many catalytic processes

$$N_2 + 3H_2 \rightarrow 2NH_3$$



Accounts for 1.4% of global CO_2 emissions

Catalysis could play a role in H_2 storage



More efficient (De)hydrogenation catalysts are needed