פסטיבל המחקר השנתי הראשון

בנושא

אנרגיה וקיימות

08.12.2021

Office of the Vice President and Dean
for Research and Development
Ben-Gurion University of the Negev

Center for Energy & Sustainability
Ben-Gurion University of the Negev

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Wavelength dependent photogeneration in metal-oxides for solar water splitting

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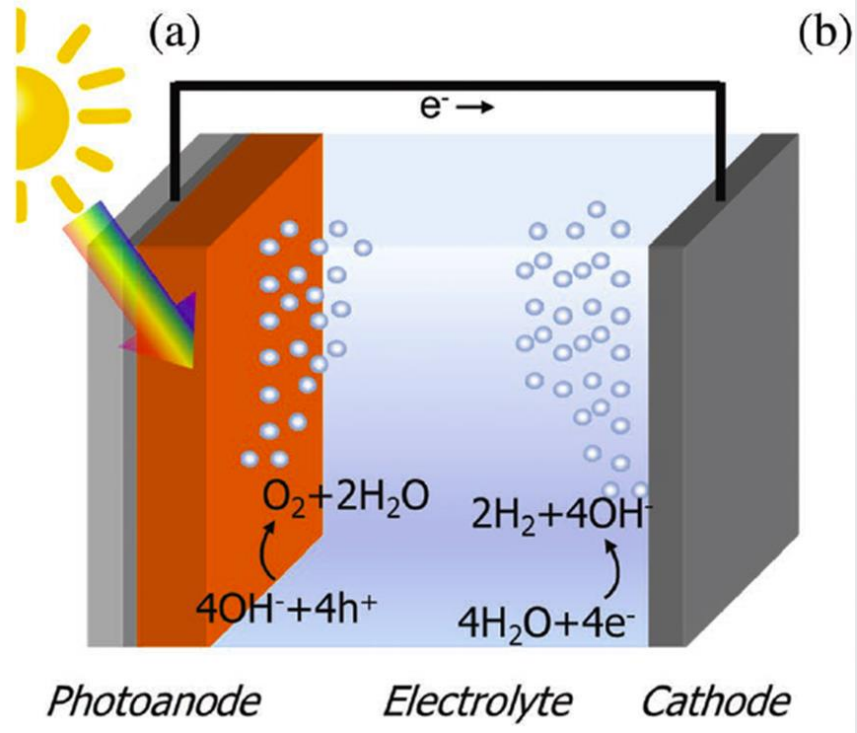
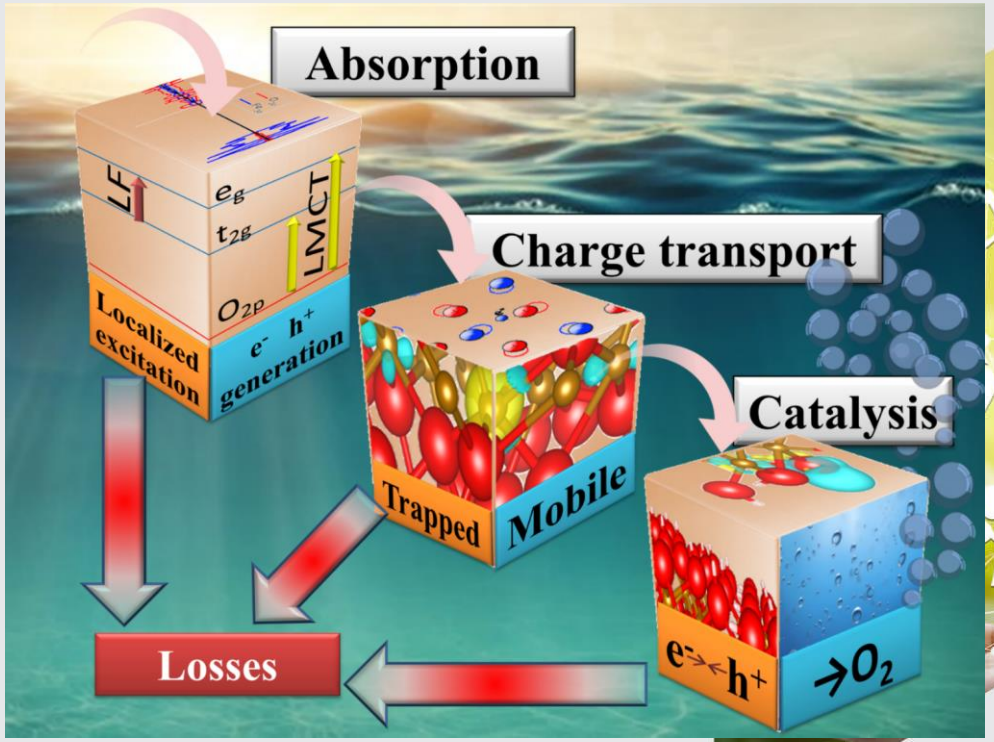
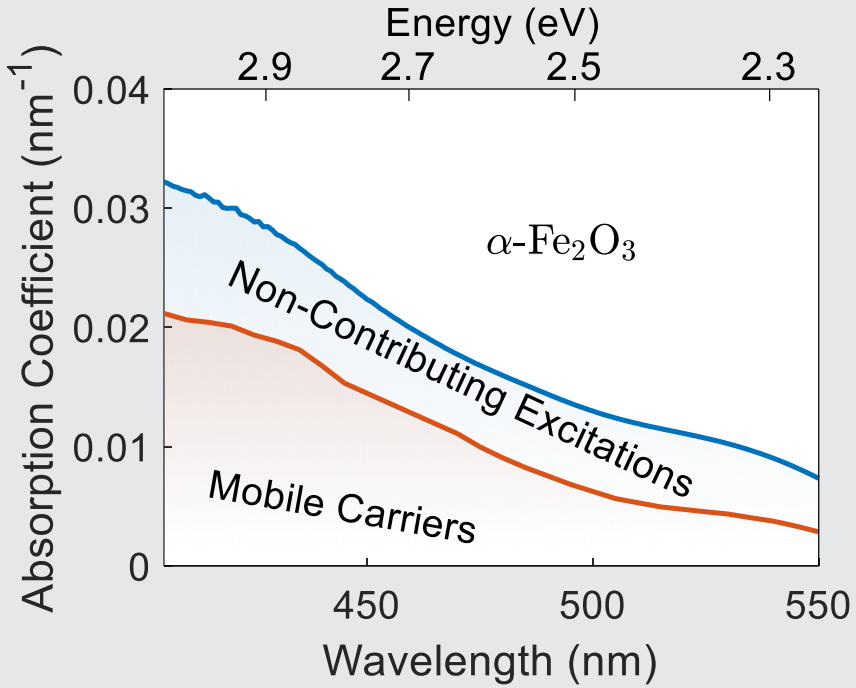
Photoelectrochemical cells for solar water splitting





One-step (direct) conversion of solar energy to hydrogen

Photogeneration Yield



(Grave et al, *Nature Materials*, 2021)

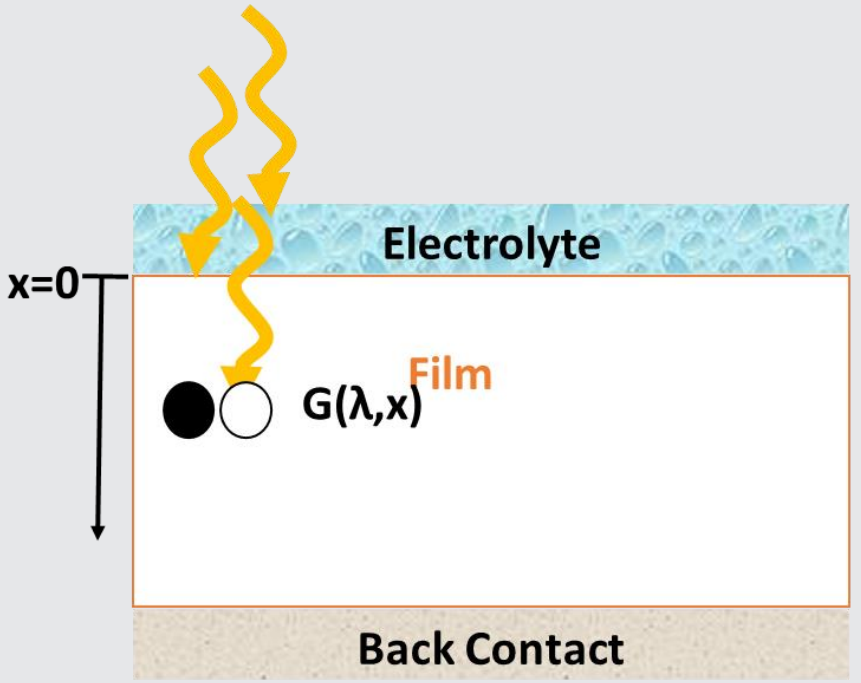
- Photogeneration yield fundamentally limits photoelectrode performance
- Need to improve photogeneration yield
- Doping is often used to improve transport – does it have any effect on the photogeneration yield?

Spatial Collection Efficiency

$$EQE(\lambda) = \int_0^d \frac{I(\lambda,x)}{I_0(\lambda)} \cdot \alpha(\lambda) \cdot \xi(\lambda) \cdot p(x) \cdot \mathrm{d}x$$

$$\xi(\lambda) \cong \lim_{d \to 0} \left\{ \frac{EQE(\lambda)}{\alpha(\lambda) \cdot d} \right\} \cdot \frac{1}{\frac{\bar{I}(\lambda)}{I_0(\lambda)} \cdot \bar{p}}$$

Ultrathin film approximation



Thank You