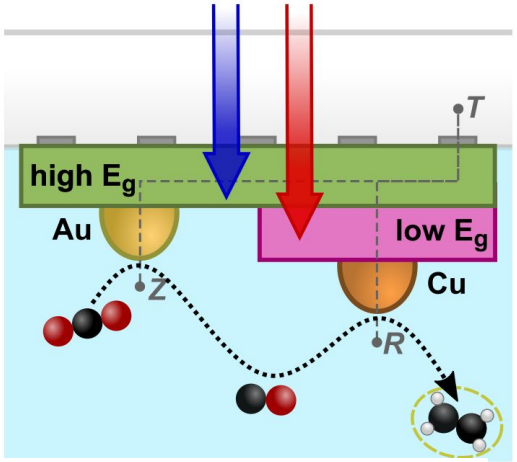
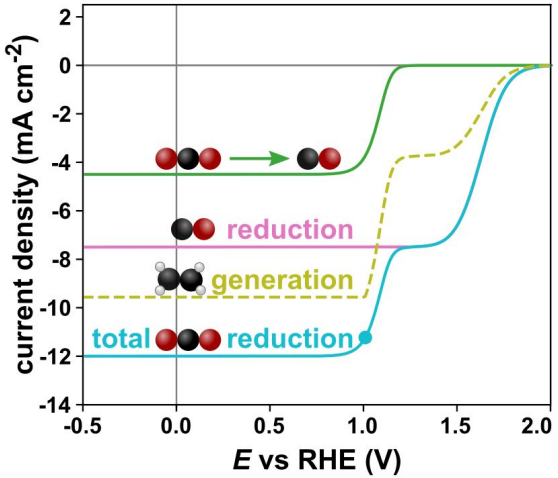
Tandem Cascade Photoelectrochemical Devices



Catalysts in the cascade operated at different, light-controlled potentials



At the operating point, conversion rates of the two catalysts are matched

Scientific Achievement:

Design principles have been developed for the concept of cascade photoelectrocatalysis.

Significance and Impact:

Co-design connects electrical architecture to cascade chemical pathways. Cascade devices can be more efficient and less sensitive to variations in catalyst activity than devices with a single catalyst.

Research Details:

- 3-terminal tandem (3TT) photovoltaic cell coupled to selective electrocatalysts
- Two step conversion of CO_2 to ethylene via CO intermediate used as model system
- Equivalent circuit model finds optimal operating conditions

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