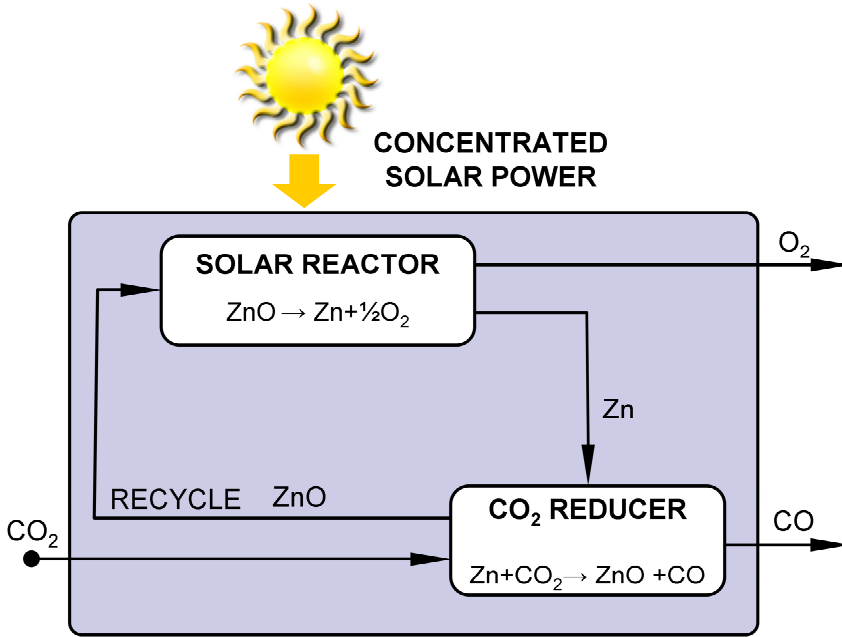


A two-step solar thermochemical CO₂-splitting cycle using Zn/ZnO redox reactions

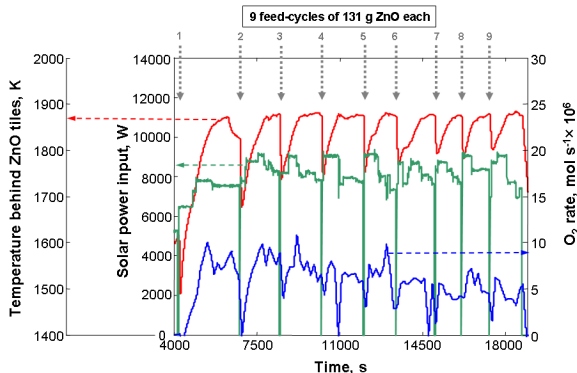
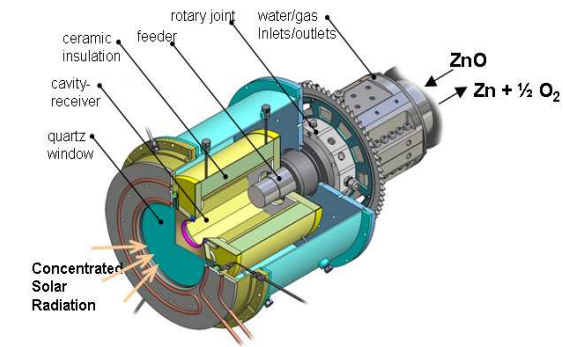


- **Net reaction**
 $CO_2 \Rightarrow CO + \frac{1}{2}O_2$
- **Solar step:**
 $ZnO \Rightarrow Zn + \frac{1}{2}O_2$
 $\Delta H_{298K}^\circ = 350 \text{ kJ mol}^{-1}$
- **Non-solar step:**
 $Zn + CO_2 \Rightarrow ZnO + CO$
 $\Delta H_{298K}^\circ = -68 \text{ kJ mol}^{-1}$
- **Maximum solar-to-chemical efficiency of 39%**

- Gálvez et al., *Energy & Fuels* 5 (2008) 3544–3550
- Loutzenhiser et al., *Energy & Fuels* 23 (2009) 2832-2839

State-of-the-art reactor technologies

Solar reactor



CO₂-reduction reactor

