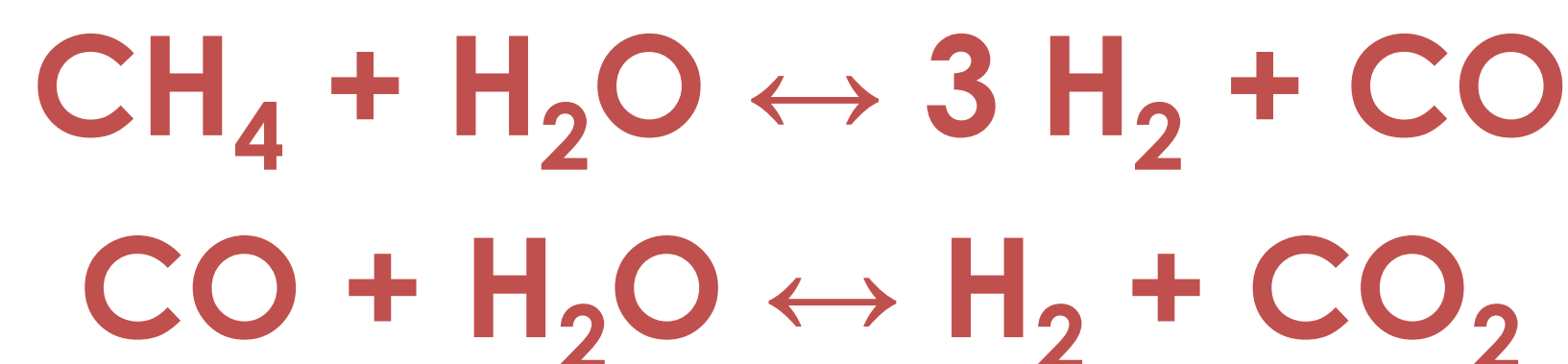


Why dry reforming?

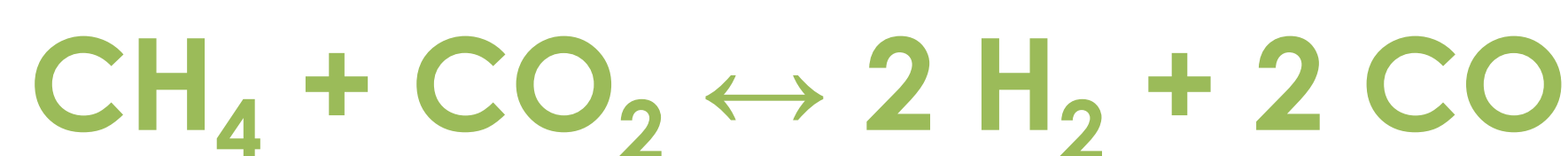


Methane steam reforming

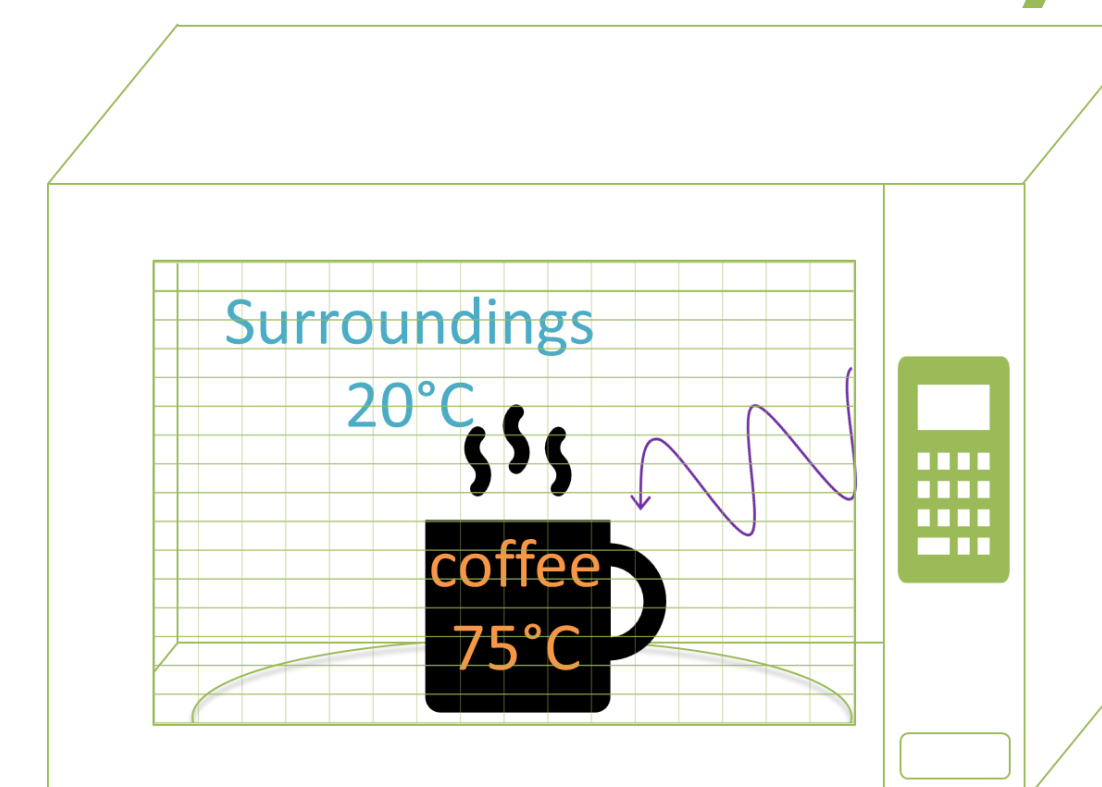
- generates 9 tonnes CO₂ for each tonne of H₂

Dry reforming methane

- consumes CO₂ instead of producing
- generates syngas in a 1:1 ratio
- Requires higher temperatures**

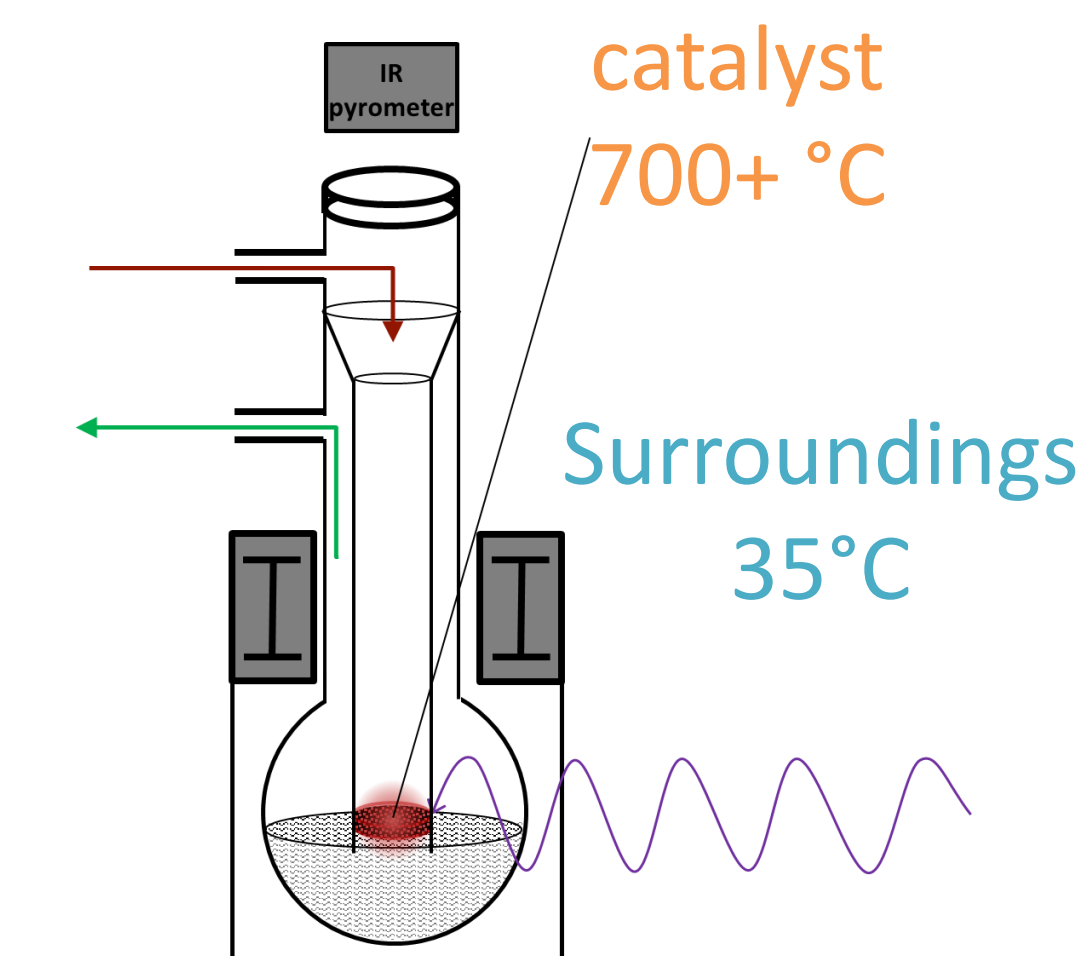


Why microwaves?

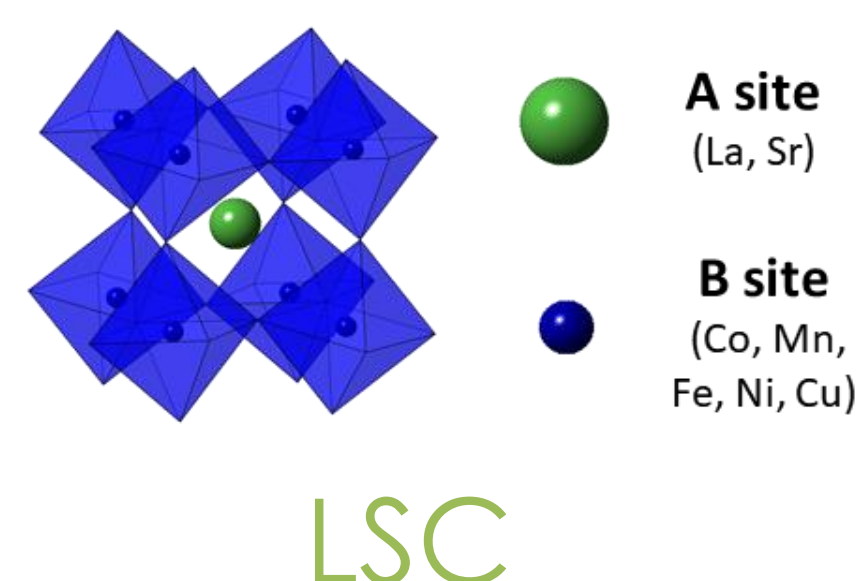


- Microwaves heat selectively
- Saves energy and time by only heating what needs heating

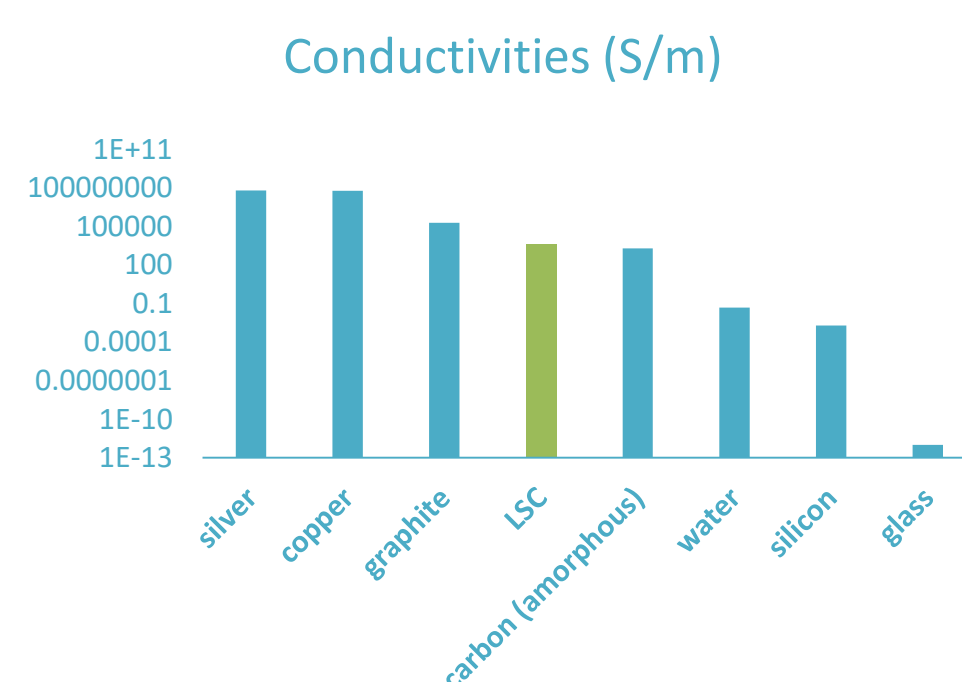
- Chemical reaction occurs at catalyst surface
- Selectively heat where the reaction occurs



Conductive oxides

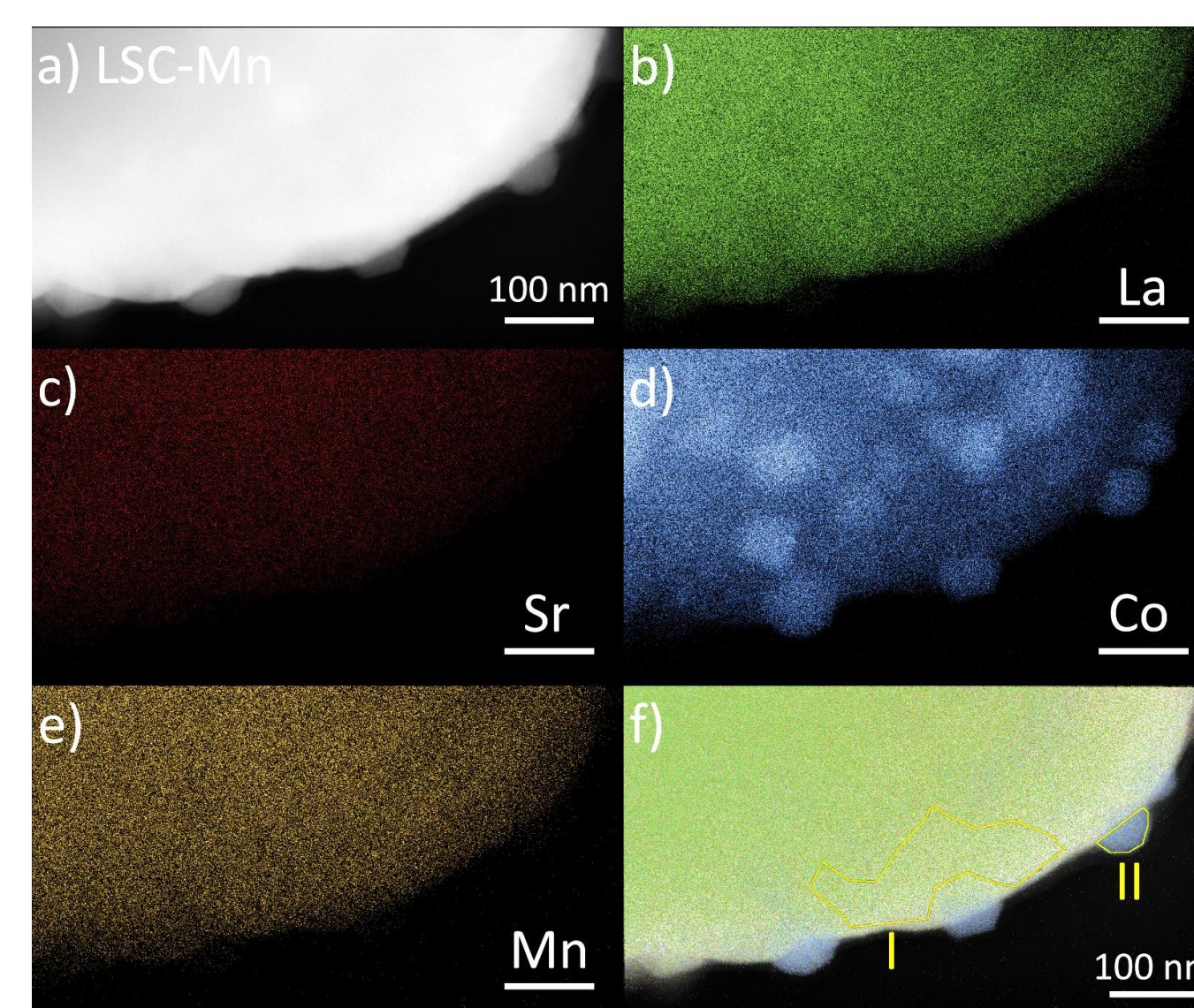


- Our catalysts are based on the conductive perovskite oxide La_{0.8}Sr_{0.2}CoO₃ (LSC)
- As an oxide, LSC can safely be heated in air to remove coke



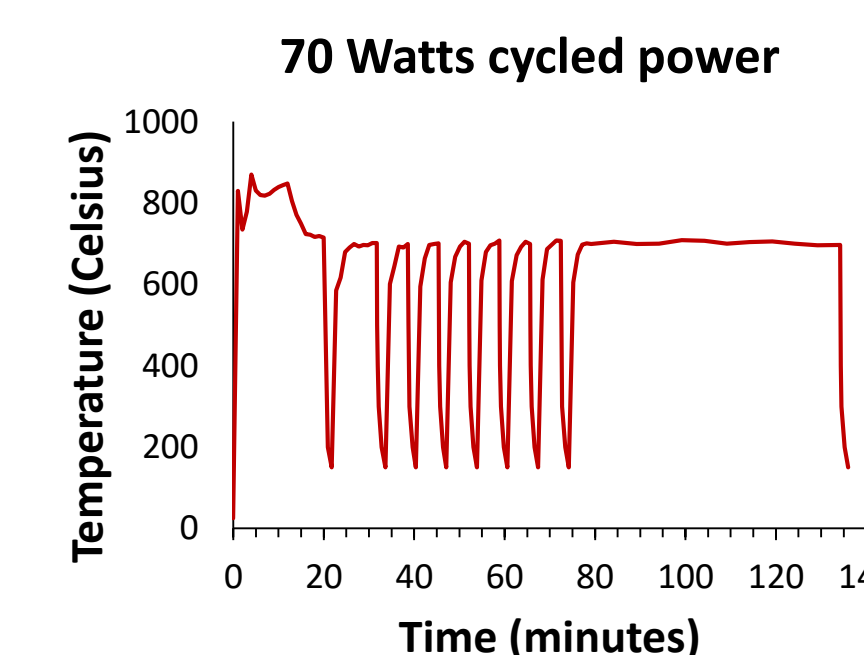
- High conductivity allows it to heat efficiently in microwave

Active site evolution



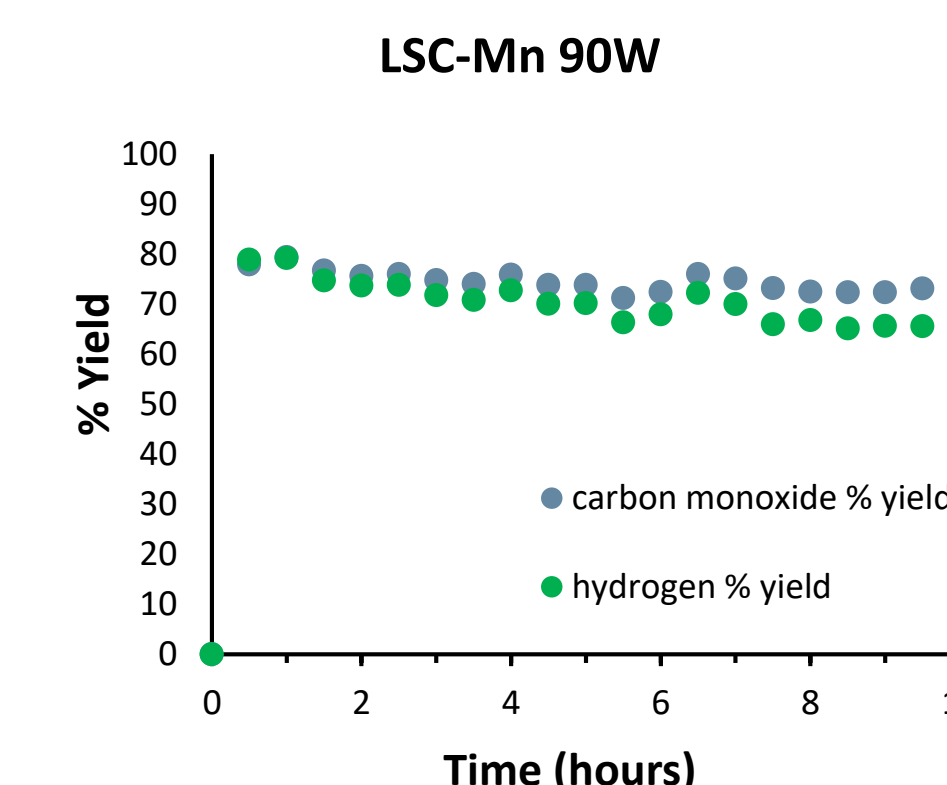
- Under reaction conditions, catalyst partially reduces
- Reduction leads to metal nanoparticles forming

Catalyst Performance



- Microwave heating allows rapid, efficient heating and cooling

- Optimized catalysts give stable performance for ~10 hours
- Heating in air or CO₂ restores to initial conversions



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