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# Catalytic Hydrogen Production

## Thermal Splitting of Water at Low Temperatures Using Nano-Structured Cobalt

### Key Features:

- Efficient generation of hydrogen to power fuel cells/electric vehicles/etc.
- Safe, on-demand production eliminating the need for hydrogen storage
- Clean fuel with no greenhouse gas emissions when hydrogen produced by renewables

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# The Hydrogen Economy

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Delivering energy with hydrogen

## Advantages

- Clean → H<sub>2</sub>O
- Efficient → Up to 85%
- Renewable
- No Greenhouse Gases
- Existing Technologies

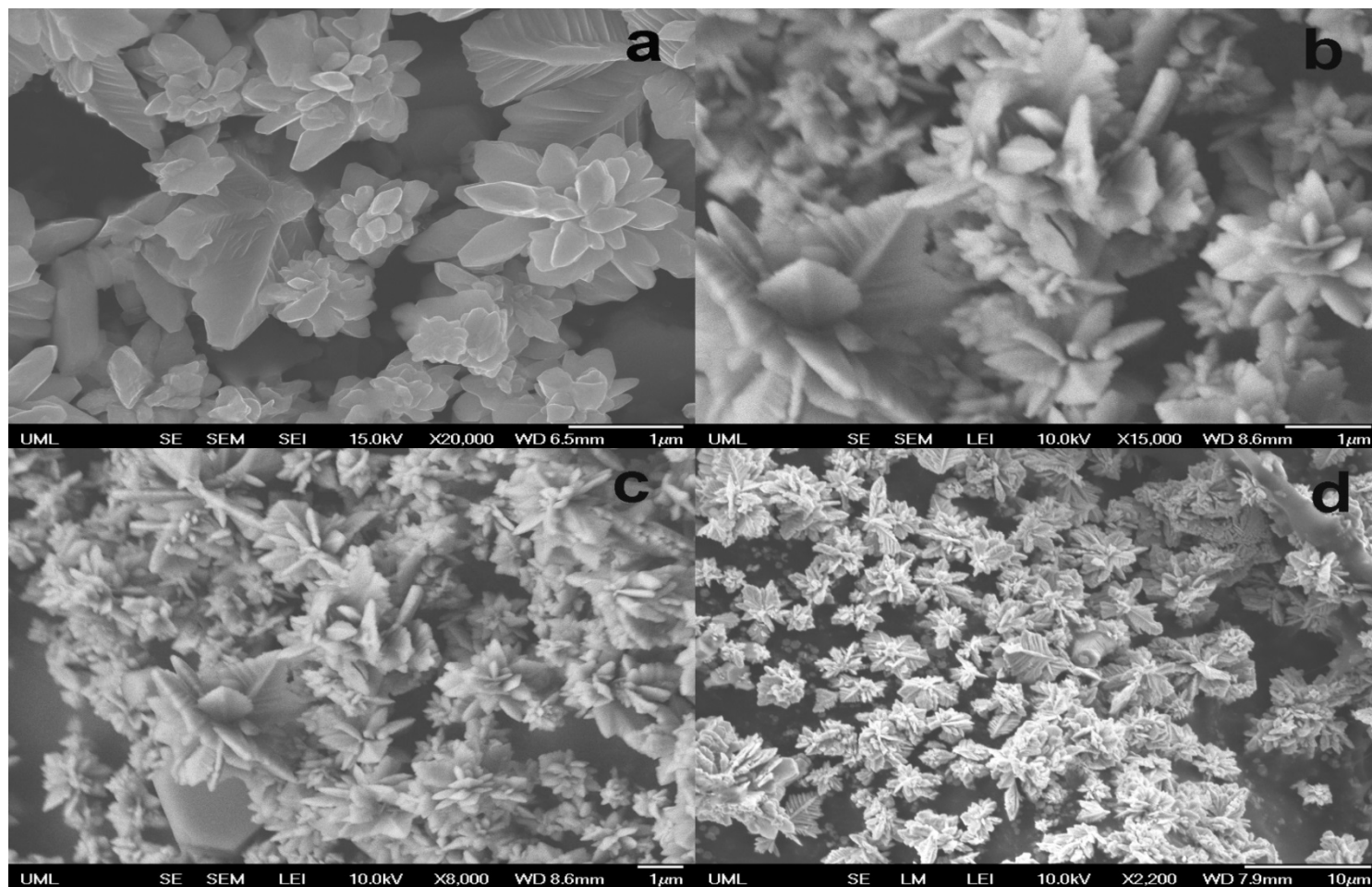
## Disadvantages

- Not a Source of Energy
- Expensive to Produce
- Difficult to Store
- Highly Flammable Gas
- Infrastructure Needed



Catalytic Hydrogen Technology solves these problems

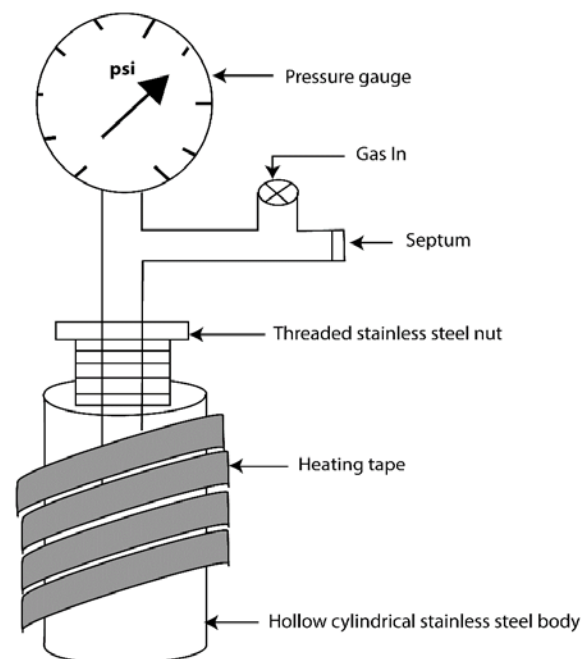
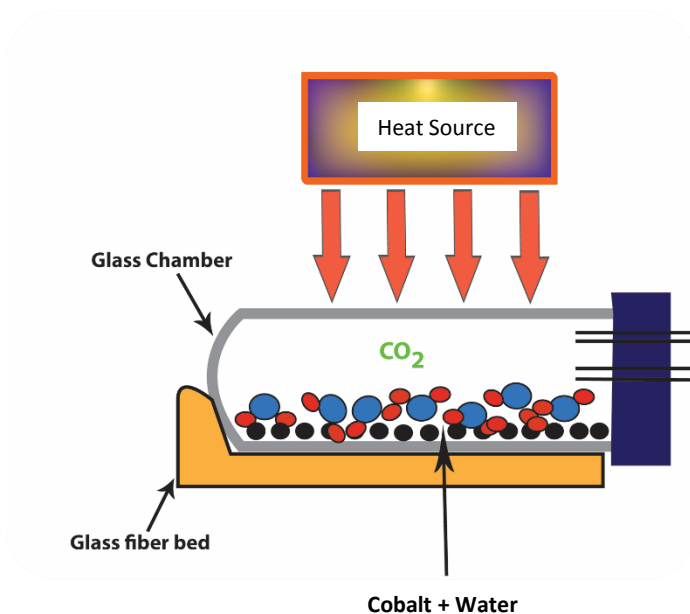
# Catalytic Hydrogen Technology



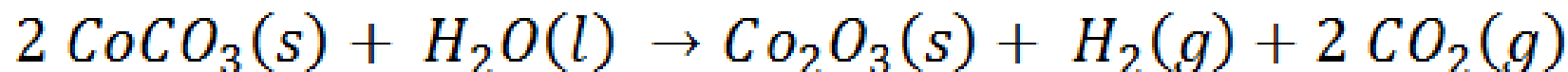
SEM Images of Synthesized Nano-Structured Cobalt Particles

# Catalytic Hydrogen Technology

- Batch reactors for  $H_2$  generation



# Catalytic Hydrogen Technology



- Process is catalytic in  $\text{CO}_2$
- Uses only Water,  $\text{CO}_2$  and Cobalt at basic pH
- Cobalt regenerated by several methods
- Hydrogen production easily controlled (T & P)
- Safe, clean, efficient Hydrogen production

# Next Steps

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- Continuous H<sub>2</sub> Generator
- Optimize & Improve Yield (currently 30 %)
- Couple with fuel cell for prototype system
- Acquire additional funds for tech development
- Secure utility patent/PCT
  - Provisional patent filed March 20, 2017  
“Catalytic Hydrogen Production”  
(Docket No.: SLW 4724.011PRV, UML 2017-006)