Energy Conversion Devices

Fuel Cell Electrocatalyst Development Program

DOE Non-Platinum Electrocatalyst Workshop

March 21-22, 2003

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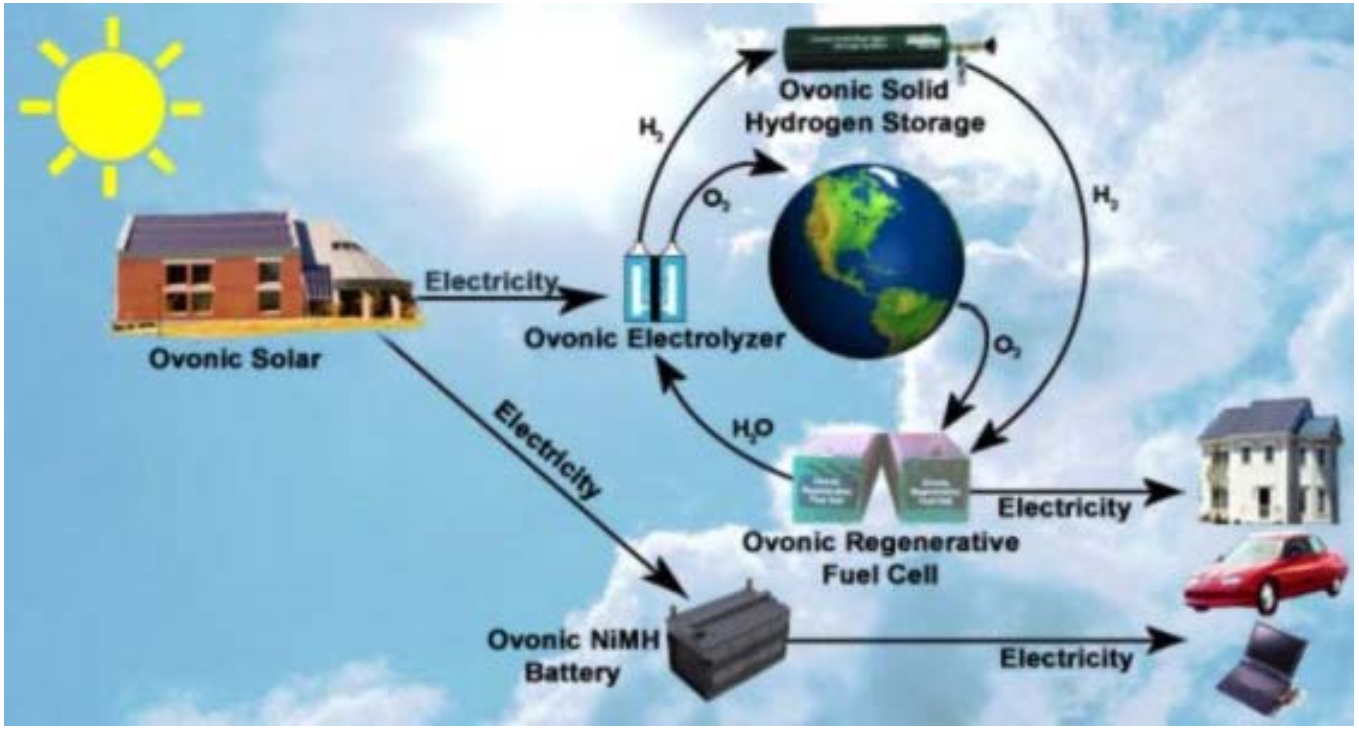

Fuel cells are a critical component in the Ovonic total hydrogen system approach.

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ECD has pioneered materials research in amorphous and disordered materials. Advances include:

- Nickel metal hydride (NiMH) batteries, negative and positive electrode materials
- Thin-film amorphous silicon photovoltaics
- Non-volatile phase change materials for use in memory devices
- Thin film electrocatalyst coatings for OER and HER applied to alkaline water electrolysis
- Corrosion resistant amorphous coating for hot acidic solutions
- Solid state metal hydride hydrogen storage beds
- Storage/catalyst materials for H_2 electrodes for ORFC™*
- Non-noble metal catalysts for air electrodes for the ORFC

* Ovonic Regenerative Fuel Cell

ECD: Fuel Cell Manufacturer

Commercializing the Ovonic Regenerative Fuel Cell™

Texaco Ovonic Fuel Cell Company, LLC

- non-precious metal catalysts
- regenerative braking energy absorption capability
- wide temperature range
- instant start capability
- low-cost materials & low cost manufacturing
- alkaline electrolyte

ECD: Catalyst Provider

- Twenty years of development effort in non-precious metal catalysts for ORR/OER and HOR/HER
  - USP# 4,430,391"Fuel cell cathode"
  - USP# 4,487,818 "Fuel cell anode based on a disordered catalytic material"
- Catalysis and nanotechnology → products
- Materials technology development with a manufacturing focus

ECD (TOFC) already manufactures gas diffusion electrodes based on non-precious metal electrocatalysts for H_2/air fuel cells.

ECD PEMFC Catalyst Development

Evaluation programs exist for several groups of electrocatalysts

metal/metal oxides	ORR/OER
complex metal oxides	ORR/OER
stabilized macrocycles	ORR
alloys	HOR/HER
metal hydrides	HOR/Chem. Reductant

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PEMFC Electrocatalyst Development Program

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