Fuel Cells Using Low-Temperature Conducting Materials

Tech ID: 11235 / UC Case 2005-510-0

ABSTRACT

Preparation of nanometric oxides that exhibit enhanced protonic conductivity at low temperatures.

FULL DESCRIPTION

Researchers at the University of California, Davis have developed a novel method to fabricate nanometric oxides that exhibit enhanced conductivity. Conduction in these materials (e.g., cubic zirconia and other materials with similar properties) takes place by protonic movement as opposed to ionic mobility, making it possible to operate a fuel cell at much lower temperatures. The marked reduction of the resistivity in these materials at low temperatures are comparable to that typical of other protonic conductors but with the advantage of superior mechanical properties, chemical stabilities, and the lack of a need for a catalyst.

APPLICATIONS

- Manufacturers of oxide fuel cells and those involved in hydrogen separation

FEATURES/BENEFITS

- Lower operating temperatures (i.e., 50 - 100°C)
- Avoids deleterious effects of high temperature on electrodes and related components

RELATED MATERIALS

- Anselmi-Tamburini U, Maglia F, Chiodelli G, Riello P, Bucella S, and Munir ZA. 2006. Enhanced low-temperature protonic conductivity in fully dense nanometric cubic zirconia. Appl. Phys. Lett. 89, 163116.
- Kim S, Anselmi-Tamburini U, Park HJ, Martin M, and Munir ZA. 2008. Unprecedented Room-Temperature Electrical Power Generation Using Nanoscale Fluorite-Structured Oxide Electrolytes. Adv. Mater. 20, 556–559

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	8,609,565	12/17/2013	2005-510
United States Of America	Issued Patent	7,601,403	10/13/2009	2005-510

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OTHER INFORMATION

KEYWORDS

nanometric oxides, fuel cells, oxide fuel cells

CATEGORIZED AS

- **Energy**
  - Storage/Battery
- **Materials & Chemicals**
  - Nanomaterials
- **Nanotechnology**
  - Materials
- **Transportation**
  - Alternative Propulsion

RELATED CASES

2005-510-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Improved Ceramics And Ceramic Composites

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