Bulk Metallic Glass Nanowires for use in Energy Conversion and storage devices

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Description:

~13nm nanowires with advantageous utility in electro-catalytic applications, e.g., fuel cells. The high surface area materials circumvent conventional Pt-based anode poisoning and the agglomeration/dissolution of supported catalysts during long-term operation by exploiting the unique physical and chemical properties of bulk metallic glass to create nanowires for electro-catalytic applications, e.g., fuel cell and battery applications. These amorphous metals can achieve unusual geometries and shapes along multiple length scales. The absence of crystallites, grain boundaries and dislocations in the amorphous structure of bulk metallic glasses results in a homogeneous and isotropic material down to the atomic scale, which displays very high strength, hardness, elastic strain limit and corrosion resistance. The melting temperatures of the disclosed bulk metallic glasses are much lower than the estimated melting temperatures based on interpolation of the alloy constituents making them attractive as highly malleable materials.

Advantages: No CO corrosion in DNFC fuel cells, Pt concentration at surface only; exceptionally high surface area current collector.

Fields of Application: Fuel cell electrodes, current collectors, ultracapacitors, sensors, implantable sensors

Stage of Development: 2mm micro-fuel cell prototype.

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Publications:

Kumar G., Taylor AD., Schroers J., ACS Nano, 3 March 2011