Bifunctional Catalysts For Rechargeable Metal-air Batteries

Metal-air batteries are green power supplies which generate little pollutants and CO2 emission. They are desirable to power electric vehicles and large-scale energy storage systems. Metal-air batteries rely on the electrochemical reactions between a metal and oxygen molecules, therefore requiring an air permeable but liquid impermeable electrode assembly as the air cathode. The air electrode requires a delicate control of its porosity, hydrophobicity, electrical conductivity and most importantly, the catalysts.

The technology is related to the development of a bifunctional catalyst capable of catalysing both oxygen reduction reaction (ORR) and oxygen evolution reaction (OER) for metal-air battery application. The technology provider is seeking for interested industry partners to collaborate for further development of this technology into products as well as technology licensing opportunities.

**Potential Applications**

Potential applications on air electrode systems for electrically rechargeable metal-air batteries (zinc-air, aluminium-air, iron-air), alkaline fuel cells and oxygen electrolyzers.

**Customer Benefits**

- Improved performance of metal-air batteries
- Lower material cost for catalyst in metal-air electrode systems compared to Pt/C

**Technology Features & Specifications**

The invention provides a bifunctional catalysts lanthanum cobalt manganese oxides (LCMO), which is

- Low cost, at least 10 times cheaper than platinum on carbon (Pt/C)
- Competitive to commercial Pt/C in terms of oxygen reduction reaction (ORR)
- Outperforms Pt/C in terms of oxygen evolution reaction (OER)
- Long term operation, perform continuously for at least 300 hours (Pt/C < 50 hours)
- Cycling stability, show little degradation at least after 1200 cycles (Pt/C non-active after 100 cycles)
- Synthesis via hydrothermal method

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