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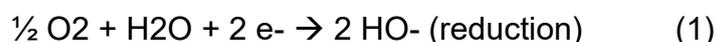
**Title:** Development and Potential Applications of Magnesium-Air Semi-Fuel Cells

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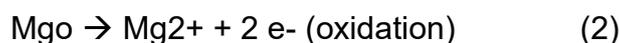
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**ABSTRACT**

The novelty of this device lies in the use of a highly effective, chemically robust ruthenium (IV) oxide (RuO<sub>2</sub>) anode, which mediates the electroreduction of oxygen (Eq. 1):



The anode consists of magnesium, a sacrificial metal, which can be replaced after it is consumed (Eq. 2):



The cell can operate with various electrolytes, including seawater, river water, sewage, soft drinks, etc. The cells can be built in various sizes and shapes, as needed for a certain application. In 2017, the system was granted U.S. Patent Number 9,627,694. The magnesium-air semi-fuel cells can serve as a reserve battery, which supplies electricity on demand, typically in emergency situations. Several suitable applications include powering the man-overboard locator, monitoring pool water contamination, and devising smart diapers.