



## METAL COMPOUND BASED CATALYSTS FOR ELECTROSYNTHESIS OF HYDROGEN PEROXIDE AND LINEAR PAIRED ELECTROCHEMICAL VALORIZATION OF BIOMASS-DERIVED FEEDSTOCKS

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### The Invention

UW-Madison researchers have developed an improved electrochemical valorization strategy that leverages an electrocatalyst capable of carrying out two-electron oxygen reduction reactions (2e<sup>-</sup> ORR). The electrocatalyst, embodied as a cathode, is a metal chalcogenide (e.g., NiSe<sub>2</sub> or PdSe<sub>2</sub>) was chosen based on its selectivity towards acidic hydrogen peroxide electrosynthesis. In practice, their approach is realized as an electrochemical cell that comprises a counter electrode (anode) and an electrolyte. The electrolyte includes oxygen, hydrogen peroxide, or hydroxyl radicals as well as a regenerable metal ion, and a biomass derived feedstock. When voltage is applied, the biomass derived feedstock (e.g., glycerol) is oxidized to a desirable C1-3 oxidation product. Additional features and alternative embodiments includes an acidic anolyte, an anode immersed in the anolyte, and a second biomass-derived feedstock. The result is a highly efficient valorization system that requires minimal external energy and is generalizable to a variety of biomass-derived feedstocks.

### Additional Information

#### For More Information About the Inventors

- [Song Jin](#)

#### Tech Fields

- [Clean Technology : Biobased & renewable chemicals & fuels](#)
- [Materials & Chemicals : Catalysts](#)
- [Materials & Chemicals : Synthesis](#)

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