



ELECTROCHEMICAL HYDROGENOLYSIS OF CARBONYL GROUPS IN ALDEHYDES AND KETONES USING ZINC CATHODES

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The Invention

UW-Madison researchers have developed a new process, termed electrochemical Clemmensen reduction, in which an electrochemical cell is used to perform hydrogenolysis and Zn is used as an electrocatalytic cathode. In this cell, carbonyl reduction at Zn is paired with an oxidation reaction at the anode (e.g., water oxidation, oxidative upgrading of biomass). Therefore, the electrons used for carbonyl reduction come from the oxidation reaction at the anode and not from oxidation of Zn, allowing the Zn electrode to be preserved via protection from the applied cathodic bias. Since the surface of the Zn cathode in this electrochemical cell still promotes hydrogenolysis over hydrogenation, this electrochemical Clemmensen reduction can offer a sustainable route for selective hydrogenolysis. Furthermore, since the reaction rate for electrochemical Clemmensen reduction can be increased simply by increasing the overpotential, the use of concentrated acid can be avoided, offering safer and milder reaction conditions.

Additional Information

For More Information About the Inventors

- [Kyoung-Shin Choi](#)

Tech Fields

- [Clean Technology: Biobased & renewable chemicals & fuels](#)

For current licensing status, please contact Jennifer Gottwald at jennifer@warf.org or 608-960-9854