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Insights: Publications

# Advances in Electrochemical Modification Strategies of 5-Hydroxymethylfurfural

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The development of electrochemical catalytic conversion of 5-hydroxymethylfurfural (HMF) has recently gained attention as a potentially scalable approach for both oxidation and reduction processes yielding value-added products. While the possibility of electrocatalytic HMF transformations has been demonstrated, this growing research area is in its initial stages. Additionally, its practical applications remain limited due to low catalytic activity and product selectivity. Understanding the catalytic processes and design of electrocatalysts are important in achieving a selective and complete conversion into the desired highly valuable products. In this Minireview, an overview of the most recent status, advances, and challenges of oxidation and reduction processes of HMF was provided. Discussion and summary of voltammetric studies and important reaction factors (e.

g., catalyst type, electrode material) were included. Finally, biocatalysts (e. g., enzymes, whole cells) were introduced for HMF modification, and future opportunities to combine biocatalysts with electrochemical methods for the production of high-value chemicals from HMF were discussed.