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Recent Progress of Magnetic Field Effect on Catalysts

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Message from the Guest Editors

Developing new strategies to advance the performance of catalysts is crucial to mitigating multiple contemporary technological challenges. Recently, research on the intersection of magnetic fields and catalysis has attracted increasing attention, and magnetic field-enhanced catalysis has been employed as a frontier and novel strategy to further improve conventional catalysts' activity, selectivity, and overall efficiency. The unique magnetic field effects in the catalytic process, including the magnetothermal effect can accelerate the reaction rate, relieve the adhesion of bubbles on the electrode, promote mass transfer, and change the reaction pathway. This results in significantly increased catalytic activities in the hydrogen evolution reaction (HER), the oxygen evolution reaction (OER), the CO2 reduction reaction, etc. On the other hand, when a magnetic field is employed in a catalyst synthesis system, the specific structures will be adjusted, which can also promote the improvement of catalytic performance. Although considerable progress has been achieved in magnetic field-mediated strategy, there is still much space for future combinations of catalysts with magnetic fields.