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Atomically Dispersed Metal sites for Electrochemical Energy Conversion

This abstract focuses on the recent work in developing the most promising PGM-free catalysts for electrochemical energy applications, which are closed collaborated with scientists at Oak Ridge National lab. In particular, single and dual atom catalysts based on atomically dispersed, nitrogen-coordinated metal sites (M–N–C catalysts) will be discussed in terms of their history, present achievements, and remaining challenges. We specifically concentrate on the active-site structure and critical factors governing catalytic activity and performance durability for various critical electrochemical reactions, including oxygen reduction and CO2 reduction, for energy storage and conversion. We highlighted potentially effective strategies for improving performance by controlling the catalyst structure at the atomic scale, mesoscale, and nanoscale. We discuss the importance of overcoming often-observed activity–stability trade-offs and the importance of advanced modelling for the rational design of catalysts.

Topical Area

Hard matter: energy materials

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