**Laser solid-phase synthesis of single-atom catalysts**

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Single-atom catalysts, featuring isolated atoms on solid supports, are a leading area in heterogeneous catalysis due to their highest atom utilization, distinct active sites, and superior activity and selectivity. However, they face two major challenges: the trade-off between activity and stability, and difficulties in large-scale production. Here, we report a laser solid-phase synthesis technique for fabrication of single-atom catalysts. This method enhances activity and stability in single-atom, diatomic, and atomic-cluster catalysts through laser irradiation and integrated structure design, enabling efficient production. It shows great potential in electrocatalysis and thermocatalysis. The strong interaction between the laser and precursors/supports creates new mechanisms, offering fresh insights for catalysis research and application, and advancing the industrialization of laser technology in single-atom catalyst preparation.

**Short Bio: Zhu Liu** received her PhD degree in Materials Science from Liverpool University, UK. She served as a tenured professor at the University of Manchester, UK. She joined the Ningbo Institute of Materials Technology and Engineering (NIMTE), Chinese Academy of Sciences (CAS) in 2023. She has established a research team focusing on laser synthesis of new energy materials, and has undertaken various national, Zhejiang provincial, and Ningbo municipal R&D projects. She has developed laser solid-phase synthesis of atomically dispersed catalytic materials, with related technologies applied in fields of hydrogen production via water electrolysis, hydrogenation of carbon dioxide, and green manufacturing of flexible perovskite solar cells. She has published 180 SCI papers in international journals (Light: Science and Applications, Advanced Energy Materials, Advanced Functional Materials, etc.), with over 7,500 citations and an h-index of 46.