

Surface and Interface Engineering of Energy Materials

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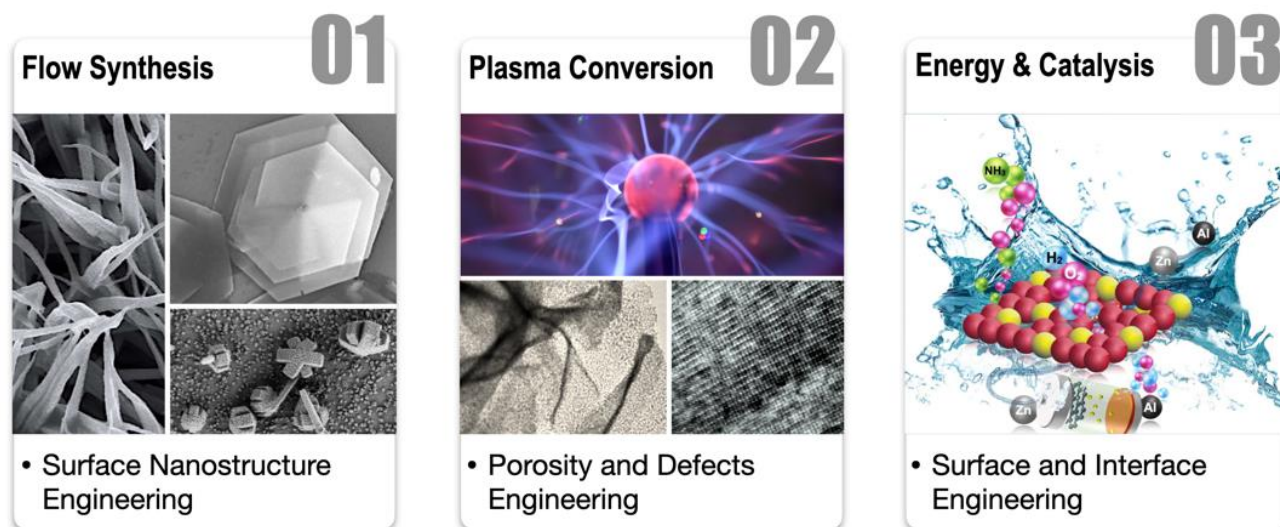
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Graphical Abstract

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Abstract

Energy and environment are the two main challenges facing our society. Practical large-scale utilization of renewable energy (such as solar and wind) requires both efficient energy conversion and energy storage. Since most of the energy conversion and storage processes involves the surface reactions and electrode-electrolyte interfaces, the regulation of the surface and interface property of nanomaterials therefore serves as a power tool for enhancing their overall performance. We developed novel synthetic approaches (i.e., continuous flow synthesis and plasma conversion synthesis) to manipulate the surface morphology, nanoscale porosity, and atomic defects of nanomaterials and explored their applications in electrocatalytic oxygen evolution, hydrogen evolution, nitrate reduction, and aqueous rechargeable batteries, and further demonstrated the structure-

property-device performance relationship. We also developed new devices by coupling different catalytic reactions to enable the simultaneous fuel production and electricity generation upon wastewater purification.

Keywords: Surface; interface; screw dislocation; plasma; energy storage and conversion.

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Biography of Presenting Author



Hanfeng Liang is an associate professor at Xiamen University. Before joining Xiamen University, he was a visiting scholar at University of Wisconsin-Madison and a postdoc at King Abdullah University of Science and Technology. He currently serves as a Section Associate Editor for *Frontiers in Materials* and is on the Wiley's Chemistry and Chemical Engineering Advisory Panel and the (youth) editorial board of several journals (e.g., *The Innovation*, *Exploration*, *Chinese Chemical Letter*, *Catalysis Communications*). He was named in the World's top 2% Scientist List for 2 consecutive years (2019 & 2020). His research interest lies on rational synthesis of nanomaterials and functional coatings for electrocatalysis and energy storage. Dr. Liang has published over 70 paper with > 8000 citations (h-index 39).

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