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Catalysis using physical mixture catalysts

Abstract:

The global economy is heavily reliant on the sustainable energy sources. Among these, the catalytic conversion of biomass and hydrogen energy production are long-term and important subjects. To date, the alloyed nanoparticle catalysts have proven to be the most active materials, particularly in terms of the chemical-physical interaction among metal atoms during the alloying process. However, the alloying process tends to compromise the electrochemical potential between the multi-metals, resulting in an imbalance between oxidation and reduction reactions. Our research demonstrates that by physically separating the catalytic components or placing them at a spatial distance, we can almost double the reaction rate compared with that achieved with the corresponding alloy catalyst across a wide range of chemical oxidation and hydrogenation reactions. The discovery of this catalytic effect: a cooperative mixture enhancement, provides an alternative approach to the design of multicomponent heterogeneous catalysts.

Biography

Dr Xiaoyang Huang completed his PhD in 2019 from Cardiff University and continued his postdoctoral research at Cardiff University, School of Chemistry. From 2021 to 2023, he worked as an invited scientist at Xiamen University, China and the Korea Institute of Energy Technology, South Korea. He is now a professor at the Institute of Advanced Interdisciplinary Studies, Chongqing University with special interest in alcohol oxidation reaction. He has published more than 25 papers in reputed journals, ie, Nature, JACS, ACS Catalysis, ACS Nano and has been serving as an editorial board member of Chinese Chemical Letters (IF = 9.1) and Green Carbon.