



Chinese Researchers Develop Fast, Precise Method for Platinum-Group Catalyst Synthesis

Descrizione

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TIANJIN, China, July 12, 2026 /PRNewswire/ - On July 10, 2026, a research team from Tianjin University published new findings in the journal Science, presenting a millisecond-scale thermal pulse technology that enables the ultrafast synthesis and precise control of platinum-group catalysts.

The paper, titled "Transient assembly of precision-tuned platinum-skin intermetallic catalysts for fuel cells," proposes a "transient assembly" strategy for preparing platinum-group metal core-shell catalysts, offering a new route for improving hydrogen fuel cell performance and advancing green energy technologies.

Platinum-group catalysts play a critical role in modern energy, chemical and environmental industries. Building core-shell structures composed of platinum-group metals and non-precious metals with high efficiency and precision is key to achieving both high catalytic activity and reduced use of precious metals.

Conventional synthesis methods usually rely on prolonged high-temperature annealing processes, which are often time-consuming, energy-intensive and difficult to control precisely. To address these challenges, the Tianjin University team and its collaborators developed a non-equilibrium transient assembly strategy. Through periodic thermal pulses, the method delivers energy with millisecond-scale precision and drives nanocrystals to assemble into core-shell structures through continuous evolution of high-energy transient configurations. It also enables precise control over the atomic-layer thickness of the platinum shell.

According to the study, the new approach can shorten a conventional multi-step process that usually takes several hours to just a few minutes. It can also produce a precisely controlled three-atomic-layer platinum shell, helping optimize geometric and electronic effects and enhance catalytic activity.

The technology reduces the energy consumption required to synthesize catalysts per unit mass by 90 percent and avoids the use of hazardous or highly polluting reagents.

Catalysts synthesized through the new method achieved a rated power of 15.2 kilowatts per gram of platinum in hydrogen fuel cells, while also showing excellent durability.

Hu Wenbin, a professor at Tianjin University and corresponding author of the paper, said the technology provides a new approach for the precise and efficient synthesis of noble metal catalysts with fine structures.

The technology is expected to support broader applications in green hydrogen, high-end chemical manufacturing, environmental catalysis, fine chemicals and pharmaceutical synthesis.

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