

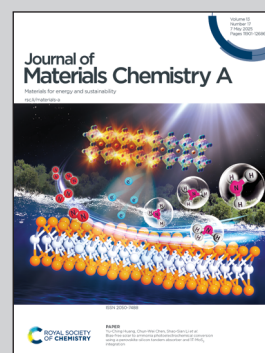
Showcasing research from Prof. Yuichi Negishi's laboratory, Tohoku University, Japan and Dr. Kenji Iida, Hokkaido University, Japan.

An atomically precise  $\text{Pt}_{17}$  nanocluster: its electronic structure and high activity for the hydrogen evolution reaction

This study revealed the electronic structure of  $[\text{Pt}_{17}(\text{CO})_{12}(\text{PPh}_3)_8]^{2-}$  cluster and explore its catalytic activity in the hydrogen evolution reaction (HER). Our findings found that  $[\text{Pt}_{17}(\text{CO})_{12}(\text{PPh}_3)_8]^{2-}$  possesses a discrete electronic structure, with the HOMO and LUMO primarily constituted by the s, p, and d orbitals of Pt; that a  $\text{Pt}_{17}$  NC-supported carbon-black catalyst ( $\text{Pt}_{17}/\text{CB}$ ) achieves 3.59-times the HER mass activity of a commercially available Pt/CB catalyst; and that the optimal electronic structure of the surface Pt atoms in  $\text{Pt}_{17}/\text{CB}$  significantly enhances its HER activity.

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### As featured in:



See Tokuhiwa Kawawaki, Kenji Iida, Yuichi Negishi *et al.*, *J. Mater. Chem. A*, 2025, 13, 12124.