Showcasing research from Prof. Yuichi Negishi's laboratory, Tokyo University of Science, Japan

Activation of hydrogen-evolution reactivity in an Rh-doped SrTiO₃ photocatalyst under visible-light irradiation by loading with controlled platinum nanoclusters

Rhodium-doped strontium titanate (SrTiO₃:Rh)-based photocatalysts have long been studied because they can produce hydrogen (H₂) from abundant visible light and water in Z-scheme water-splitting systems. Further improvement of the H₂-evolution reaction (HER) activity of SrTiO₃:Rh is desired to enhance Z-scheme water splitting. In this study, we established the synthesis method of hydrophilic ~1 nm platinum nanoclusters (Pt NCs) using a ligand-exchange method while maintaining the geometric structure, and loaded the Pt NCs onto SrTiO₃:Rh. The Pt NC-loaded SrTiO₃:Rh exhibited HER activity that is 30% higher than the Pt cocatalyst-loaded SrTiO₃:Rh prepared using the conventional photodeposition method.