

Synthesis of Carbon Dots from Rice Straw and Its Application to Produce Efficient Electrocatalysts for Hydrogen Evolution Reaction

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We report a facile method to synthesize carbon dots (Cdots) from rice straw and then use it as a directly reducing agent as well as a stabilizer to produce Cdots@Au nanoparticles. Rice straw-derived Cdots possesses oxygenated groups, which act as an electron-donating source to reduce Au^{3+} to Au^0 . The strong Au-carbon interaction propels a high electron transfer for Cdots@Au electrocatalyst towards enhanced-performance in hydrogen evolution reaction (HER). When Cdots@Au electrocatalyst is used for the HER process, the HER activity is maintained stable for 2000 cycles. The overpotential is 150 mV at a current density of $10 \text{ mA}\cdot\text{cm}^{-2}$, which is the outstanding HER performance for Au nanoparticles as a non-Pt HER electrocatalyst.