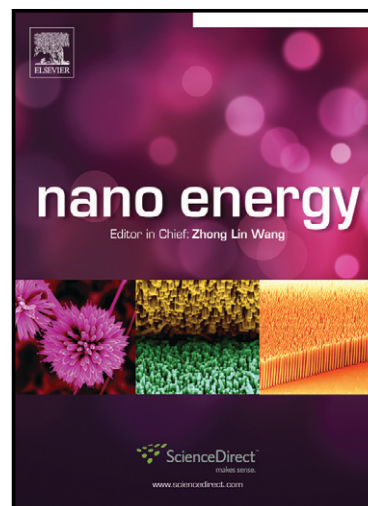


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Sulfur and nitrogen self-doped carbon nanosheets derived from peanut root nodules as high-efficiency non-metal electrocatalyst for hydrogen evolution reaction

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Development of non-metal catalysts for hydrogen evolution reaction (HER) with both excellent activity and robust stability has remained a key challenge in recent decades. Herein, sulfur and nitrogen self-doped carbon nanosheets are prepared as efficient non-metal catalysts for HER by thermal decomposition of peanut root nodules, an abundant biowaste. The obtained S and N-doped carbons exhibit a porous and multilayer structure with a specific surface area of 513.3 m²/g and high electrochemical area of 27.4 mF/cm². Electrochemical measurements show apparent electrocatalytic activity for HER in 0.5 M H₂SO₄, with a small overpotential of only -0.027 V, a Tafel slope of 67.8 mV/dec and good catalytic stability. The density functional theory calculations confirmed that both S and N doping significantly

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