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# **Nano-netlike carbon fibers decorated with highly dispersed CoSe<sub>2</sub> nanoparticles as efficient hydrogen evolution electrocatalysts**

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## **ABSTRACT:**

More active sites and high conductivity are two effective ways to improve the activity of non-noble metal electrocatalysts. Herein, we present a facile electrostatic spinning technique to synthesis highly dispersed CoSe<sub>2</sub> nanoparticles on three-dimensional nano-netlike carbon fibers through simple thermal treatment of polyacrylonitrile fibers containing Co ions (Co<sup>2+</sup>-PANF) and subsequent in-situ selenization. Moreover, we show that the resulting material (denoted as CoSe<sub>2</sub>-CFN) can serve as highly active, efficient and stable non-precious metal electrocatalyst for HER in acidic media. This material achieves a current density of 10 mA/cm<sup>2</sup> at an overpotential of 133 mV with a loading amount of the active material CoSe<sub>2</sub> about 0.128 mg/cm<sup>2</sup>, which is lower than that of the reported CoSe<sub>2</sub>-based materials. Meanwhile, CoSe<sub>2</sub>-CFN exhibits excellent catalytic stability for at least 20 hours and gives nearly 100% Faradaic yield. The excellent hydrogen evolution reaction performance is due to the

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