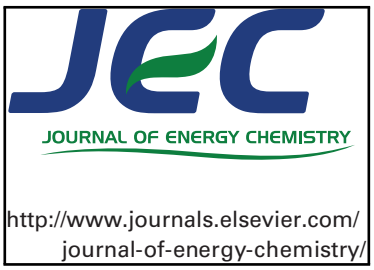

In-situ carbonization approach for the binder-free Ir-dispersed ordered mesoporous carbon hydrogen evolution electrode

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In-situ carbonization approach for the binder-free Ir-dispersed ordered mesoporous carbon hydrogen evolution electrode

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Abstract: A binder-free Ir-dispersed ordered mesoporous carbon (Ir-OMC) catalytic electrode has been prepared through a designed in-situ carbonization method, which involves coating resorcinol and formaldehyde mixtures with iridium precursors onto the three-dimensional nickel foam framework, followed by in-situ calcination in N_2 atmosphere at 800 °C for 3 h. This electrode shows a large surface area, ordered mesoporous structure and homogeneous distribution of metal nanoparticles. It presents good activity and stability towards hydrogen evolution reaction, which is attributed to the efficient mass and electron transport from the intimate contact among Ir nanoparticles, ordered mesoporous carbon matrix and 3D conductive substrate. We hope that this in-situ carbonization synthetic route can also be applied to design more high-performance catalysts for water splitting, fuel cells and other clean energy devices.