

Investigation of IrRu-based multi-functional Catalysts using sulfur doped-Ordered Mesoporous carbon Supports for Fuel Cell Reversal Tolerant Anode

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Fuel-Cell Electric Vehicles (FCEVs) have been considered as an attractive automobile due to high energy density, high-efficiency, and zero-emission features. Nevertheless, during FCEVs drive operation, the various transient condition cause H₂ fuel starvation, leading to cell reversal voltage. This issue induces water electrolysis and carbon oxidation reaction at the fuel cell anode. As the Reversal Tolerant Anode (RTA) strategies, application of the Oxygen Evolution Reaction (OER) catalysts have been studied to promote the water oxidation rather than the carbon supports oxidation. In previous study, IrRu-based alloy which has multi-functional catalytic activities for the hydrogen oxidation reaction (HOR) and OER was introduced. Herein, to maximize catalytic performance, sulfur doped order mesoporous carbons (S-OMC rod and platelet type) materials were used to as the OER catalyst supports with the purpose of increasing interaction between metal and supports. IrRu₄/S-OMC was particularly observed the highest HOR-OER activity thanks to the strong interaction between Iridium and sulfur