ZINC COPPER NANOPARTICLES DEPOSITED ON REDUCED GRAPHENE OXIDE FOR OER AND ORR IN ALKALINE MEDIA

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The energy crisis and environmental protection, as the most attractive topic in recent years, have encouraged researchers around the world to focus on the development of technologies for the production and storage of clean energy, such as batteries and fuel cells [1]. Therefore, high-performance bifunctional catalysts for the oxygen evolution reaction (OER) and the oxygen reduction reaction (ORR) occuring at the electrodes of such systems are of great importance [2]. The ZnCu/rGO catalyst showed good activity for both reactions. Namely, the mentioned catalyst demonstrated outstanding performance in terms of current density (ca. 45 mA cm−2) and Tafel slope (101 mA cm−2) compared to Pt/C (ca. 15 mA cm^{-2} and 198 mV dec^{-1}, respectively) [3]. As can be seen from the Fig.1B, ZnCu/rGO material also showed activity toward ORR, which will be investigated at different rotation speeds in the future to perform the Koutecki-Levich analysis. The stability of ZnCu/rGO material in the conditions of OER and ORR polarization will be examined as well, as it is one of the crucial propreties for materials' use in commercial systems.

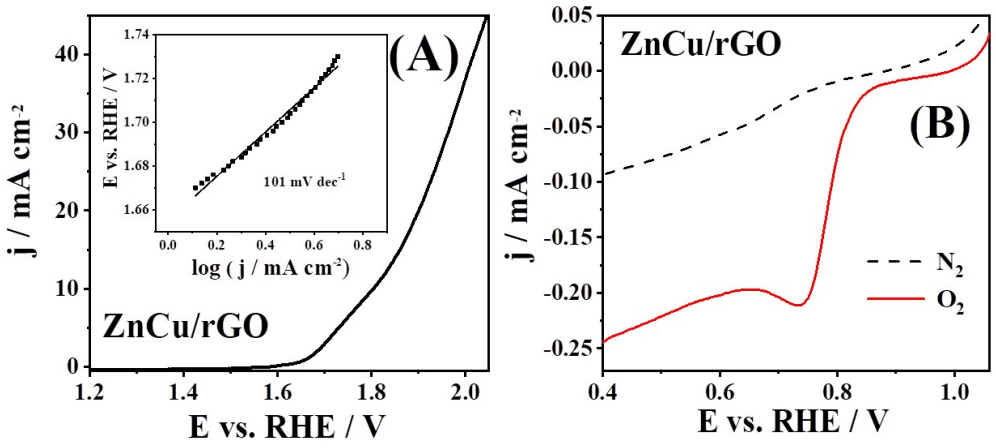

Fig. 1. OER polarisation curve in 1 M KOH with the corresponding Tefel plots in the inset for ZnCu/rGO (A) and LSVs for same sample in N2- and O2-saturated 1 M KOH (B).

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[3] O^4 and Co^3O^4/S^2 bifunctional catalysts with enhanced electrocatalytic properties for reversible oxygen evolution and reduction reaction, Int. Jounal Hydrog. Energy. 48 (2023) 27568–27581. https://doi.org/10.1016/j.ijhydene.2023.03.433.

3]*D.Mladenovi, D.M.F.Santos, G.Bozkurt, G.S.P.Soylu, A.B.Yurtcan, .Mil jani, B.l juki, Tailoringmetal − oxide − supportedPtNiasbif u*