

OXYGEN REDUCTION ON SILVER CATALYSTS ELECTRODEPOSITED ON VARIOUS NANOCARBON SUPPORTS

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In this work, Ag particles were electrodeposited onto nitrogen-doped graphene oxide (NGO), graphene, multi-walled carbon nanotube (MWCNT), and Vulcan carbon XC-72R supports by varying the upper potential limit [1]. The surface morphology of the resulting Ag-based catalysts was examined by scanning electron microscopy (SEM). The electrochemical oxygen reduction reaction (ORR) was tested in alkaline media employing the rotating disk electrode (RDE) method. The variation of the upper potential limit influenced the size of silver nanoparticles and their number density on the substrate surface. All the Ag-based electrocatalysts studied in this work showed remarkable ORR activity in terms of half-wave potentials. The ORR results combined with hydrogen peroxide reduction results prove that all Ag catalysts tested are suitable for both reactions. Ag/NGO2 catalyst possesses the highest mass activity for ORR, which indicates a relationship between the Ag loading and electrocatalytic activity. The electroreduction of oxygen on all the electrodeposited silver catalysts follows a four-electron pathway in alkaline environment. These materials are promising alternatives for Pt/C catalyst to be used as alkaline membrane fuel cell cathodes [2].

References:

[1] J.M. Linge, H. Erikson, M. Merisalu, V. Sammelselg, K. Tammeveski, 2021, *Sn Applied Sciences* 3, 263

[2] H. Erikson, A. Sarapuu, K. Tammeveski, 2019, *ChemElectroChem* 6, 73-86.



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