

# A STUDY OF OXYGEN REDUCTION ON GLASSY CARBON ELECTRODES COATED WITH ANTHRAQUINONE MODIFIED GRAPHENE AND MULTI-WALLED CARBON NANOTUBES

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In the present study, graphene (GR) and multi-walled carbon nanotubes (MWCNTs) were grafted with anthraquinone (AQ) groups using the corresponding diazonium salt (Fast Red AL salt). The surface functionalisation via diazonium reduction was performed electrochemically and also spontaneously. Glassy carbon (GC) electrodes were employed as a substrate material and coated with the unmodified and AQ-modified GR or MWCNTs. The prepared electrodes were studied towards oxygen reduction in 0.1 M KOH and the highest electrocatalytic activity was observed in case of spontaneously AQ-grafted MWCNTs and anion exchange ionomer (AS-04) coated electrode (see Fig. 1). Additionally, high loadings of AQ on the modified electrodes were found indicating the suitability of this method for the applications that need a high amount of modifier molecules on GR or MWCNTs. Also, X-ray photoelectron spectroscopy revealed the presence of azo linkages referring to the formation of multilayers during the electrografting with AQ [1].

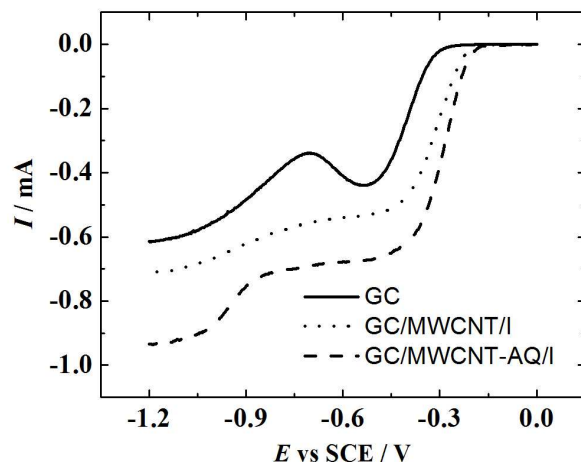


Fig. 1 RDE voltammetry curves for oxygen reduction on bare GC, MWCNTs and  $\text{OH}^-$  ionomer coated GC (GC/MWCNT/I), AQ-modified MWCNTs and  $\text{OH}^-$  ionomer coated GC (GC/MWCNT-AQ/I) electrodes in  $\text{O}_2$ -saturated 0.1 M KOH ( $\omega = 1900 \text{ rpm}$ ,  $\nu = 20 \text{ mV s}^{-1}$ ) [1].

## References

1. M. Mooste, E. Kibena-Põldsepp, L. Matisen, K. Tammeveski, 2016, *Electroanalysis* (in press).



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