

Cyclic voltammetric behaviour of the O₂/O₂⁻ redox couple at a HMDE and its interaction with nisoldipine

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We have studied the O₂/O₂⁻ redox couple on the HMDE in DMSO aprotic media, obtaining optimal conditions of both oxygen concentration and scan rate in order to avoid oscillatory phenomena. By choosing the oxygen concentration and scan rate appropriately we obtained well-resolved reversible and reproducible cyclic voltammograms for the O₂/O₂⁻ redox couple. A ΔE_p value of 63.0 ± 5.2 mV for scan rates between 0.6 and 10 V s⁻¹ was obtained. The current ratio, I_{pa}/I_{pc} , depended on the scan rate, tending to one as the scan rate increased suggesting that oxygen reduction followed an EC mechanism with the second order superoxide disproportionation reaction as the chemical step. We have found a disproportionation constant value of 4.08×10^3 M⁻¹ s⁻¹ with a standard deviation of ± 208 and a coefficient of variation of 4.8%. Furthermore, we have used the cyclic voltammetric response of the O₂/O₂⁻ redox couple in order to study the interaction of the dihydropyridine drug nisoldipine with superox