

A ligand-assisted oxygen reduction reaction catalyzed by  
(nitro)cobalt porphyrins and phthalocyanines  
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The redox chemistry of the nitro, nitrosyl, and peroxynitro ligands in cobalt porphyrins and phthalocyanines has been shown to be able to catalytically activate dioxygen in its electrochemical reduction.

Two compounds have been focus of this study by cyclic voltammetry and density functional theory computational methods: the cationic porphyrin complex (nitro)(pyridyl)cobalt(III)TMpyP-2 immobilized in a Nafion® film with silver nanoparticles, and (nitro)(pyridyl)cobaltperfluoro-phthalocyanine, (NO<sub>2</sub>)(py)CoF<sub>16</sub>Pc on a graphite electrode.

The porphyrin complex shows catalytic ORR activity that is short-lived, but the phthalocyanine complex appears to be a robust catalyst. DFT computational studies were used to evaluate the thermodynamics of the system and to corroborate the observed behaviour.