

Synthesis and characterisation of spinel-type cobalt and rhodium oxide electrodes

Isabel Pereira,¹ Fernando Nunes,¹ Helena Mendona¹ and Fernanda Costa¹

¹Departamento de Química e Bioquímica, Centro de Ciências Moleculares e Materiais, Faculdade de Ciências
Universidade de Lisboa
Campo Grande Ed.C8,5 piso
Lisboa 1749-016
Portugal

This work concerns the synthesis, characterisation and study of low cost and non-pollutant new electrode materials with a suitable design for electrochemical applications.

(CoRh)₃O₄ layers on Ni supports were prepared by thermal decomposition of aqueous nitrate solutions at 400 C .

XRD and SEM/EDS techniques have been used in the characterisation of the powder samples and oxide layers. The X-ray diffractograms present the characteristic lines of a cubic spinel structure.

The influence of rhodium content on the open circuit potential and voltammetric response of the electrodes has been studied in alkaline solutions. The oxide loading has been investigated in detail to determine their influence on the voltammetric peaks, voltammetric charge and capacitive currents.

The films were tested for oxygen evolving capability in alkaline medium, by means of steady state measurements. Long term stability tests were performed under oxygen evolution conditions.

The efficiency of the system depends markedly upon the amount of rhodium present in the oxide film. This finding is explained in terms of the change in composition and cationic distribution induced by the presence of rhodium.

The electroactivity of the oxide electrodes is analysed in terms of both electronic and geometric factors.

References

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