

Mesoporous Carbon Ceramic SiO₂/C Prepared by Sol-Gel Method and Modified with Cobalt Phthalocyanine and Used as an Electrochemical Sensor for Nitrite

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Abstract : Carbon ceramic mesoporous SiO₂/50wt%C (SBET= 170 m²g⁻¹), where C is graphite, was prepared by the sol gel method. Scanning electron microscopy images and the respective element mapping showed that, within the magnification used, no phase segregation was detectable. It presented the electric conductivities of 0.49 S cm⁻¹. This material was used to support cobalt phthalocyanine, prepared in situ, to assure a homogeneous dispersion of the electro active complex in the pores of the matrix. The surface density of cobalt phthalocyanine, on the matrix surfaces was 0.015 mol cm⁻². Pressed disk, made with SiO₂/50wt%C/CoPc, was used to fabricate an electrode and tested as sensors for nitrite determination by electro chemical technique. A linear response range between 0.039 and 0.42 mmol l⁻¹, and correlation coefficient r=0.9996 was obtained. The electrode was chemically very stable and presented very high sensitivity for this analyte, with a limit of detection, LOD = 1.087 x 10⁻⁶ mol L⁻¹.

Keywords : SiO₂/C/CoPc, sol-gel method, electrochemical sensor, nitrite oxidation, carbon ceramic material, cobalt phthalocyanine

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