

Synthesis and characterization of the first cyrhetrenyl-appended calix[4]arene macrocycle and its application as an electrochemical sensor for the determination of Cu(II) in bivalve mollusks using square wave anodic stripping voltammetry

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An electrochemical sensor for the determination of Cu(II) in bivalve mollusks using a glassy carbon electrode modified with p-tert-butylcalix [4]arene-bis-cyrhetrenylimine (Cy₂(Calix [4])) by square wave anodic stripping voltammetry (SWASV) has been developed. The organometallic compound was synthesized from cyrhetrene-carboxaldehyde and 25,26-bis-(2-aminoethoxy)-26,28-dihydrocalix [4]arene through a condensation reaction. Metalloligand (Cy₂(Calix [4])) was characterized by FT-IR and ¹H-¹³C 2D NMR spectroscopies and monocrystal X-ray diffraction and was obtained as a single isolated isomer (E). The optimum chemical and electrochemical conditions for the modified electrode were optimized and the methodology was applied in different samples of bivalve mollusks with satisfactory results. A cooperative effect between the organometallic fragment and the calixarene macrocycle improves the preconcentration capacity of the electrochemical sensor, creating a new opportunity to perform rapid and sensitive analyses in the detection of copper in marine resources.