Conducting Polymer All Solid State Potentiometric Sensor for the Tramadol Assay

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A new methodology was applied for the designing potentiometric membrane sensors. An electrochemically polymerized Poly(Pyrrole)s (PPy) film was applied as a solid contact-ion to electron transducer on the surface of a pencil graphite electrode (PGE) to make an all-solid-state ion selective electrode (CP-ASS-ISE) for the determination of Tramadol Hydrochloride. A thin layer of a PVC membrane containing synthesized ion-pair as the active element and suitable plasticizer was then placed on the surface of the conducting polymer layer to prepare the sensor. The suggested sensor showed a Nernstian response (a slope of 57.17 mV per decade) over the concentration range of 1.0×10^{-6} to 1.0×10^{-1} mol L⁻¹. The Tramadol sensor had a low detection limit of 7.4×10^{-7} mol L⁻¹ with response time of less than 10s in the concentrated solutions. The working pH range of the sensor was 2.0-7.0. Finally, the proposed sensor used for the Tramadol assay in some pharmaceutical tablets.

Keywords: Potentiometry; Tramadol hydrochloride; Conducting Polymer; All-solid-state ion selective electrode (ISE); Poly(Pyrrole)s

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