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# The Nanocrystalline Coordination Polymer of AMT–Ag for an Effective Detection of Ciprofloxacin Hydrochloride in Pharmaceutical Formulation and Biological Fluid

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## Abstract

The present report highlights a cost effective and portable AMT–Ag nanocrystalline coordination polymer (NCCP) based electrochemical sensor for an efficient sensing of biologically active drug molecule ciprofloxacin hydrochloride (CFX). The AMT–Ag NCCP, is synthesized using an easily accessible organic ligand 2-amino-5-mercapto-1,3,4-thiadiazole (AMT) with silver nitrate. In the infinite polymer array of AMT–Ag, silver (I) centers are bridged by tecton AMT through the exocyclic thiol and amino linkage. A successful ultra- trace detection of CFX has been achieved due to the prominent electron channeling through the pores of polymeric nano-crystallites. The efficient charge transfer arises at the interface of electrolyte and AMT–Ag nano-crystals anchored electrode through hydrophobic interaction and  $\pi$ – $\pi$  electron coupling. The voltammogram reveals the critical redox features of CFX and provides a clear representation about the steps involved in the AMT–Ag assisted oxidation of CFX. This specific signature further applied in the voltammetric assay of CFX in pharmaceutical formulation (eye drops) and biological fluid (urine) by a significantly high sensitivity (0.002  $\mu$ A/ $\mu$ M and 0.007  $\mu$ A/ $\mu$ M) and detection limit (22 nM and 60 nM) respectively without any interference. Therefore, the developed AMT– Ag NCCP could serve as a highly valuable

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