

Abstract

The work carried out in this thesis can be summarized as follows :

- i. Developing of two simple, sensitive and selective methods for the determination of malathion pesticide in soil and water samples. The two methods were based upon the SW-CASV and DP-CASV of malathion in aqueous media of pH 2 after accumulation of its copper (II) complex at HMDE and measuring the corresponding reduction peak current at -0.42 V versus Ag/AgCl reference electrode. The developed methods were applied successfully for the analysis of trace and ultra trace concentration of malathion in water, pesticidal formulations, vegetables and soil sample. The developed methods were compared successfully with the standard GC-MS. The most probable reduction mechanism was safely assigned with the aid of cyclic voltammetry (CV) .
- ii. Studying the redox behavior of selenium (IV) – Thoron-I chelate in aqueous media of various pH at HMDE by DP-CASV and CV in an attempt to develop a highly sensitive and selective stripping voltammetric method for the chemical speciation of selenium (IV &VI) species. The method was based upon accumulation of selenium (IV)- Thoron –I complex at HMDE and measuring the current of the cathodic peak using DP-CASV. Selenium (VI) species were determined by the method after reduction to selenium (IV) with HCl to trivalent. The method was applied for the chemical speciation of selenium (IV &VI) species. The method was also applied satisfactorily for the analysis of total inorganic selenium (IV& VI) species in pharmaceutical preparation, certified reference material, water , milk and vegetables. The developed method was validated by comparison with the data obtained by ICP-MS .
- iii. Investigating the retention profile and kinetic characteristics of cadmium (II) uptake from the aqueous iodide media onto $PQ^+.Cl^-$ immobilized PUFs solid sorbent. The reagent $PQ^+.Cl^-$ treated PUFs was successfully packed in column for complete retention and recovery of cadmium as $[CdI_4]_{aq}^{-2}$ at reasonable flow rate. The performance of the $PQ^+.Cl^-$ - PUFs packed columns in terms of HETP, N, critical capacity and the breakthrough capacity towards cadmium (II) was evaluated .