Abstract

This work aims at the investigation of the influence of boron concentration in boron doped diamond (BDD) thin films on their electrochemical performance in electroanalysis. BDD thin films used in this work were prepared in Department of Functional Materials, Institute of Physics AS CR. BDD films were prepared by microwave plasma-assisted chemical vapor deposition. Films were deposited on silicon wafers and the concentration of boron was introduced by variable B/C ratio in the gas phase in the range from 500 ppm to 8000 ppm. Redox systems $[Fe(CN)_6]^{4-/3-}$ and $[Ru(NH_3)_6]^{3+/4+}$ were used for characterization of the BDD films by cyclic voltammetry. It has been proven that the anodic oxidation of BDD thin films at the potential of + 2,4 V in acidic solution stabilizes the quasireverzible response of these redox systems. Further, the potential window at the cathodic side is shorter with increasing boron concentration for selected supporting electrolytes; on the anodic side this effect is also present, but not that specific. The performance of BDD thin films on electroanalysis was tested with 2-aminobiphenyl as model compound. Using differential pulse voltammetry for its determination. Peak height and sensitivity increases with increasing concentration of boron in BDD thin film.