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Electrochemical characterization of polyaniline electrode for use in electrochemical power sources

M. Gvozdenuć¹, B. Jugović², T. Trišović², J. Stevanović³, B. Grgur¹

¹*Faculty of Technology and metallurgy, University of Belgrade, Karnegijeva 4, 11000 Belgrade, Serbia*

²*ITS-Serbian Academy of Science and Arts, Knez Mihailova 35, 11000 Belgrade, Serbia*

³*ICTM-Institute of electrochemistry, Njegoševa 12, 11000 Belgrade, Serbia*
e-mail address: popovic@tmf.bg.ac.rs

Polyaniline (PANI) electrode was formed by electrochemical synthesis on graphite under galvanostatic condition at current density of 2.0 mA cm^{-2} from aqueous solution of 1.0 mol dm^{-3} HCl and 0.25 mol dm^{-3} aniline. Electrochemical characterization of the PANI electrode was performed in 0.5 mol dm^{-3} HCl using cyclic voltammetry and galvanostatic measurements. The overall charge capacity of the PANI electrode was estimated to be $0.154 \text{ mA h cm}^{-2}$, corresponding to 25 % of the theoretical mass of PANI available for the dopant exchange. It was observed that during initial cyclization at low pH, the extent of PANI degradation products was insignificant and practically had no influence on the charge/discharge characteristics of the PANI electrode.

Keywords: electrochemical synthesis, polyaniline, rechargeable power sources