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*Potential oscillations affected by the electrochemical overoxidation of graphite in aqueous nitric acid*

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**Abstract**

Potential oscillations caused by electrochemical overoxidation of graphite in aqueous nitric acid were observed for the first time. Deep oxidation of graphite was carried out in 18 M HNO<sub>3</sub> by galvanostatic method. During the electrochemical treatment enormous anodic charge was consumed to change graphite into the graphite oxide (GO). Thus synthesized GO exhibits significantly increased concentration of epoxy, alkoxy as well as carbonyl groups. On the basis of the gained results mechanism of graphite transformation into GO in aqueous solutions of HNO<sub>3</sub> was proposed. Our investigations indicated that to achieve an effective transformation of graphite into GO, the compromise between electrolyte concentration and the stage of intercalation of intermediately formed graphite intercalation compound (HNO<sub>3</sub>-GIC) should be reached. X-ray diffraction (XRD), Raman spectroscopy, X-ray photoelectron spectroscopy (XPS), scanning electron microscopy (SEM) and transmission electron microscopy (TEM) were used to characterize the obtained material. Additionally, the influence of electrochemical oxidation of graphite in aqueous nitric acid on its chemical surface composition was investigated using FTIR spectroscopy.

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