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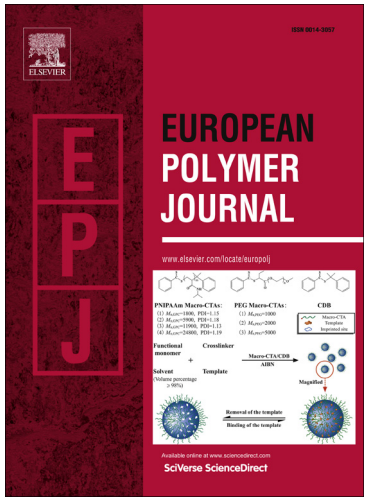

The oxidative polymerization of aniline as topochemical process. The statistical analysis of grain growth

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The oxidative polymerization of aniline as topochemical process. The statistical analysis of grain growth.

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Abstract. The films of polyaniline (PANI) on the glass slides with granular morphology were prepared by oxidative polymerization with ammonium peroxydisulfate in strong acidic conditions. The kinetics of polymerization was monitored recording of scanning electron microscopy images of deposit PANI films on glass slides. Statistical analysis of the PANI grain size was successfully applied for characterization of the polymerization process. It was shown that oxidative PANI polymerization could be described as a topochemical process. This allowed us explaining the existence of three phase of process (induction period, acceleration stage and decay) and finding the kinetics parameters of these stages. The model of phenazine nucleates was used to described induction stage. It was shown that phenazine nucleation process can be described kinetically as zero-order reaction. The acceleration stage of PANI polymerization was connected with increase of PANI grain surface during reaction and the mechanism of this acceleration was discussed. The decay stage of process was attributed with formation fuse loose PANI film with reduced available interphase surface for polymerization process.

Key words: polyaniline, polymerization, topochemistry, kinetics, statistical analysis, morphology

Abbreviated article title: Polymerization of aniline as topochemical process