CHEMICAL SYNTHESIS OF POLY(2-AMINOTHIAZOLE) IN THE PRESENCE OF GRAPHENE OXIDE

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2-aminothiazole (2-AT) is a heterocyclic amine which is biologically active in various ways. Thiazole ring is a part of numerous drugs [1] such as analgesic, antithrombotic, anti-inflammatory or many more. Particularly interesting are its antimicrobial and antitumor properties. Besides all that, poly(2-aminothiazole) (PAT), that is conjugated polymer, has heavy metal sensing and selective concentration applications [2], anticorrosive properties. Therefore PAT is a promising polymer to study, however number of publications on this topic is limited.

In this study, chemical polymerization of 2-aminothiazole has been studied. Synthesis was carried out from aqueous solutions of monomer for 18 hours while heating at 70 degrees Celsius. As initiators of polymerization we used $CuCl_2$ and $(NH_4)_2S_2O_8$ by adding them in a slow rate into reaction flask. Molar ratio of monomer and initiator was 0,2. As a result dark brown polymer was synthesized. With $CuCl_2$, as initiator of the process, yield of about 40 % was observed, whereas with $(NH_4)_2S_2O_8$ polymer almost did not formed at all. Proposed in the literature [3] scheme of polymerization of PAT is shown on fig. 1. One more sample of polymer was produced with adding of graphene oxide (GO) into the reaction mixture (250 μl of GO per 0,1 mol of 2-AT, $CuCl_2$ as initiator). Yield of PAT-GO was about 40 % (fig. 2). Graphene oxide is a frame carbon material with a high specific active surface formed by layers of graphite, the edges of which are covered with a number of functional oxygen-containing groups. The study of GO and its composites is due to special physical and chemical properties: from functional flexible films to biometric devices for medical applications can be obtained. When electrically conductive polymers contain reduced particles of GO, they can exhibit new, unpredictable properties. In such systems there is an interaction of the highly conjugated structure of GO and delocalized electrons in the chain of conjugated polymers. Therefore we studied influence of GO on surface morphology and conductivity of PAT.

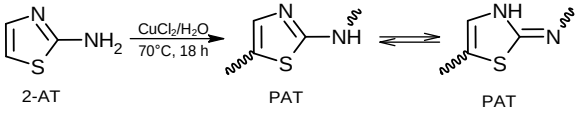

Fig. 1. Scheme of synthesis of PAT (with tautomers)

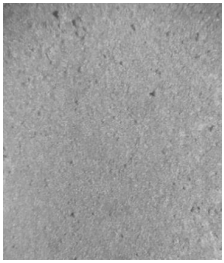

Fig. 2. Surface of PAT-GO (as initiator $CuCl_2$) through optical microscope (x120)

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