

Thermal behaviour of the immobilized thiosemicarbazone on the cross-linked ionic polymer

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Thiosemicarbazones and their complex combinations possess antibacterial, antifungal, antimicrobial, antioxidant, antituberculostatic, anti-HIV and antitumoral activities [1]. Testing of thiosemicarbazones and their coordination compounds in the determination of biological properties is carried out in a homogeneous environment. This means that the potential use of drugs containing thiosemicarbazone compounds in the treatment of living organisms will increase the speed of interactions. Usually in homogeneous liquid systems, the speed of interactions is much higher than in heterogeneous systems. But in this case the drug and dead cells or microorganisms will spread throughout the body. The action of immobilized active ingredients of drugs on solid support will be slower, but will be local.

In this paper, thiosemicarbazone 5-NO₂-salicylic aldehyde was used. Thiosemicarbazone was immobilized on the cross-linked ionic polymer AV-17(Cl). This is a commercial product containing strongly basic (ammonium) groups [2]. Thiosemicarbazone was also immobilized on the sorbent AV-17(Cr) which was obtained according to Refs. [3,4]. The AV-17(Cr) support is the AV-17(Cl) polymer in the phase of which was synthesized jarosite mineral type compounds in the form of ultrafine particles: RN[Cr₃(OH)₆(SO₄)₂]. The

AV-17(Cr) support was used on the assumption that the electron donor atoms of thiosemicarbazone will coordinate with the Cr³⁺ ions of the jarosite as a result of ligand exchange.

The research was conducted in order to know the thermal stability of the following systems: AV-17(Cl), AV-17(Cr), AV-17(Cl)-thiosemicarbazone [AV-17(Cl+HL)] and AV-17(Cr)-thiosemicarbazone [AV-17(Cr+HL)]. Thermograms were obtained in atmospheric air. But for samples AV-17(Cl) and AV-17(Cr) were obtained and in nitrogen atmosphere.

The data show that thermal degradation of sorbent samples takes place in 4-5 steps. The general conclusion is that the systems are stable (without change, only with the loss of hydrating water): AV-17(Cl) - up to 150 °C, AV-17(Cr) – up to 127 °C, AV-17(Cl+HL) up to 197 °C and AV-17(Cr+HL) - up to 220 °C (in air) and AV-17(Cl) – up to 170 °C, AV-17(Cr) – up to 148 °C (in nitrogen).

In the paper the processes of thermal degradation of the investigated systems that take place at each stage are explained.

[1] I. Iacovidis, I. Delimaris, S.M. Piperakis, *Molecular Biology International*. 2011, doi:10.4061/2011/594529.

[2] Lurie A.A., *Sorbents and Chromatographic Carriers*. Nauka, Moscow, 1972 (in Russian).

[3] Raisa Drutsa, V. Gutsanu, V. Rusu, *J. App. Polym. Sci.* 102 (2006) 3978

[4] V. Gutsanu, R. Drutsa, *Patent MD 1027, BOPI*, 9 (1998) 23