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Synthesis and properties of foam polyurethanes based on tall oil

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Abstract

The article presents the results of a study to obtain and study the properties of polyurethane foams, in which instead of a hydroxyl-containing component from petrochemical raw materials, it is proposed to use "green" raw materials based on distilled tall oil and triethanoamine. The influence of these components on the properties of the resulting polyurethane foams is analyzed. Polyurethane foams were prepared by mixing triethanolamine, tall oil, a catalyst – a 10% solution of sodium acetate in ethylene glycol, a foam stabilizer – Penta 485, and an isocyanate-containing component (polymer diphenylmethane-4,4′-diisocyanate). The technological parameters of the synthesis process of polyurethane foams are determined, as well as the physicomechanical characteristics of the obtained polyurethane foams, such as apparent density, volume fraction of closed pores, compressive strength at 10% relative deformation, thermal conductivity and water absorption during exposure for 24 hours, and also determined average pore sizes of polyurethane foams using an optical microscope. It is shown that polyurethane foams based on tall oil and triethanolamine do not differ in their technological parameters and strength properties from polyurethane foams based on synthetic polyols. The volume fraction of closed pores for them is less in comparison with industrial samples of polyurethane foams, which indicates the possibility of using such polyurethane foam for insulation and noise insulation of residential buildings and industrial structures.

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