

Research of the addition reaction of diorganyldithiophosphoric acids to vinylsiloxanes

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Abstract

Investigation of the interaction of diethyl-, dibutyldithiophosphoric acids with polyvinylsiloxane (PVS), and octavinylsilsesquioxane in a solution of toluene under ultraviolet action at a temperature of 50 °C for 18, 30 hours. The interaction of diorganyldithiophosphoric acids with octavinylsilsesquioxane proceeds with successive addition to vinyl groups. When the reaction was carried out for 30 hours, a product with a high degree of attachment was obtained. The composition and structure of the obtained phosphorus-substituted products is confirmed by elemental analysis, IR spectroscopy, diffractometry and gel chromatography. The cross-sectional area of the octavinylsilsesquioxane molecule and its phosphorated product was calculated. The calculated cross-sectional area of the initial and the obtained product coincide with the diffractometry data.

The research of the interaction of diorganyldithiophosphoric acids with PVS was carried out under the similar conditions of previous syntheses, insoluble and soluble products were obtained in all cases. Purification of the final polymeric products was carried out by hexane precipitation from a solution in toluene.

A comparison of the gel chromatography data of the initial PVS and the final products showed a peak shift toward higher molecular weights and the formation of low molecular weight products. The composition of the resulting phosphorus-containing polysiloxanes (PPS) is confirmed by elemental analysis, IR spectroscopy and diffractometry. According to the diffractometry, the cross-sectional area for phosphorus-containing polymers was calculated. The degree of adhesion did not exceed 50%.

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