

The process of oligodimethylsiloxane with terminal hydroxyl groups and isopropyl ether of orthotitanic acid interaction

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Abstract

The process of oligodimethylsiloxane with terminal hydroxyl groups and isopropyl ether of orthotitanic acid interaction was studied. This process leads to the formation of dimethylsiloxane elastomer, which is a valuable product in the production of sealing materials, high-temperature protective coatings, the starting product for heat-conducting pastes. The synthesis was carried out at a temperature of 25 °C due to the interaction of the terminal hydroxyl groups of the oligomer and the isopropoxy groups of the orthotitanic acid ester. The reaction was accompanied by the release of isopropyl alcohol, which was effectively removed from the reaction zone due to its high volatility. Along with the polycondensation reaction, an additional hydrolysis reaction of unreacted orthotitanic acid ether in the presence of atmospheric moisture is possible. The final product of the reaction was titanium oxide. The authors also analyzed the characteristics of the resulting polymer. The average particle size of titanium dioxide was determined using a microanalyzer *HoribaLB-550*, it was 45 nm. The effect of reaction time and hardener content on the properties of polydimethylsiloxane was studied. The optimal conditions for the synthesis were established. The optical properties of the polymer were studied using UV-VIS spectroscopy on the Unico-2800 spectrometer. It was found that the use of orthotitanic acid ether leads to a strong absorbing effect in the shortwave region of the spectrum, starting from 400 nm. Depending on the content of orthotitanic acid isopropyl ether and curing time, Shore A hardness was determined. The adhesive properties of the composition on a glass and steel substrate were studied. Tear strength reached 2.2 MPa.

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