Streszczenie w języku angielskim

In this doctoral dissertation, the synthesis process of (3-thiopropyl)silsesquioxanes *via* hydrolytic condensation reaction is described, followed by a detailed characterization of these compounds using various analytical techniques such as NMR spectroscopy (^{1}H, ^{13}C, ^{29}Si) and FT-IR, mass spectrometry (MALDI-TOF-MS), gel permeation chromatography (GPC), and thermogravimetry (TGA). Comprehensive studies regarding the functionalization of silsesquioxanes through hydrotiolation reaction were also conducted, aiming to obtain both monofunctional and bifunctional derivatives with mixed groups. These compounds were analyzed using spectroscopic and spectrometric techniques, including NMR (^{1}H, ^{29}Si) and MALDI-TOF-MS. A detailed focus was directed towards determining the potential applicability of these compounds through the conduct of supplementary investigations, such as thermogravimetric analysis, water contact angle studies, and density measurements. The key aspect of the work was the utilization of the amorphous form of (3-thiopropyl)silsesquioxane and selected derivatives as modifiers for plastics. The impact of these compounds on the performance properties of urethane-acrylic resins was examined through thermogravimetric analysis and water contact angle analysis. Subsequently, thermoplastic materials (polylactide, polyethylene) were modified with (3-thiopropyl)polysilsesquioxane, and the obtained materials underwent comprehensive material characterization, including thermogravimetric analysis, differential scanning calorimetry, tensile strength testing, impact resistance testing, scanning electron microscopy, and optical microscopy. The doctoral dissertation presents an interdisciplinary research approach, constituting a significant contribution to the scientific development in the field of silsesquioxane chemistry and identifying potential applications directions.