17th Brazilian Polymer Conference

October 29 to November 2, 2023
Expoville Convention and Exhibition Center
Joinville – SC

NANOCOMPOSITES OF POLYSTYRENE/PSEUDOBOEHMITE TREATED WITH OCTADECYLAMINE – 4EJX

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Introduction

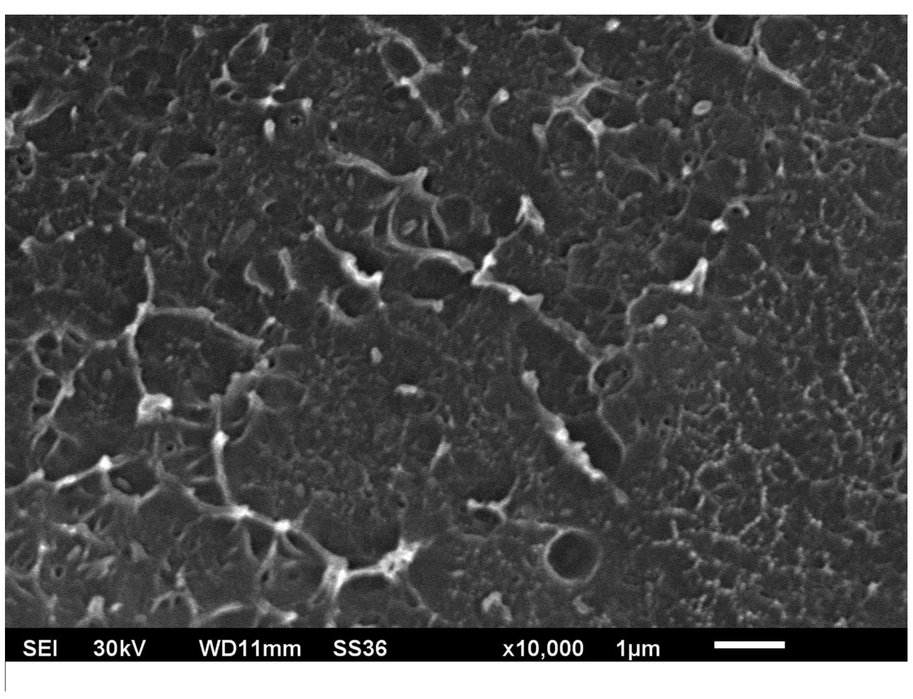
Pseudoboehmite is a synthetic aluminum oxyhydroxide made up of nanoparticles and is generally obtained by the sol-gel[1] process. Its use is extensive, being used in drug-controlled release due to the high specific surface area[2,3] and obtaining nanocomposites[4]. In addition, some ceramic nanoparticles are recognized in the literature for improving mechanical and thermal properties, among others[4,5]. This study was performed to determine how high-impact polystyrene composite containing pseudoboehmite nanoparticles behaves when the pseudoboehmite is treated with octadecylamine (ODA) to improve the compatibility of the ceramic with the polymer. The UNIGEL industry donated high-impact polystyrene (HIPS)

Methodology

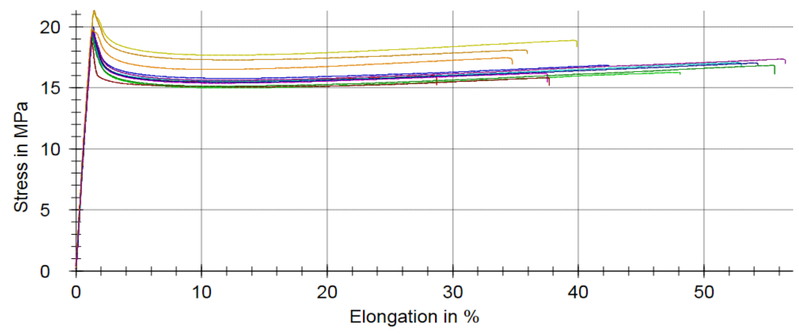
Several techniques characterized Pseudoboehmite: X-ray diffraction, differential thermal analysis (DTA), thermogravimetric analysis(TG), infrared spectroscopy, Zeta potential of the gel, scanning electron microscopy (SEM) of the powder. HIPS and HIPS composite were analyzed by tensile strength, flexural strength test, SEM, DTA, TG, impact Izod resistance, Heat Deflection Temperature (HDT), and the Vicat softening temperature.

Results / Discussions

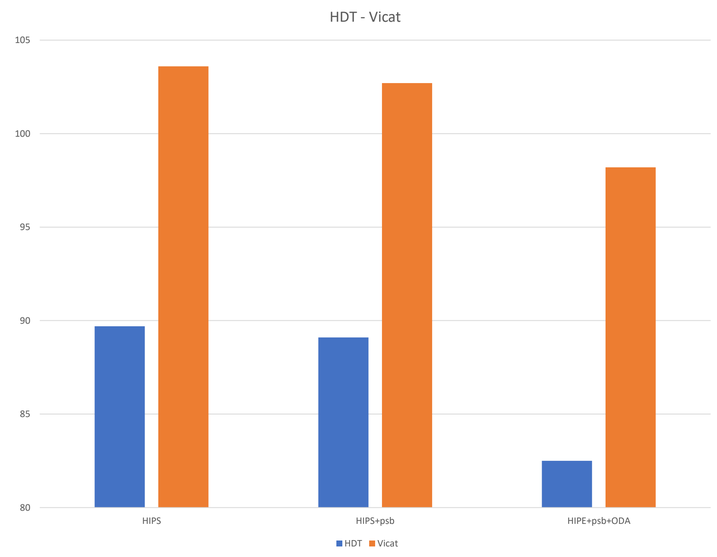
Analysis of pseudoboehmite: it was observed from the X-ray diffraction results that the only crystalline phase present was pseudoboehmite. The FTIR, DTA, and TG analysis is typical of a pseudoboehmite sample.



The SEM shows the presence of agglomerates of pseudoboehmite in the composite.



The impact resistance and tensile strength tests show that the composites in which pseudoboehmite treated with octadecylamine were used showed higher values than the composites containing only pseudoboehmite and HIPS



It was also observed that adding treated pseudoboehmite to HIPS considerably reduced the HDT and the Vicat softening temperature. The ODA increase the HDT and Vicat reduction.

Conclusions

The addition of pseudoboehmite modified the properties of the nanocomposite. But there are still agglomerates of pseudoboehmite present. To improve the nanocomposite, it is necessary to avoid the presence of agglomerates in the nanocomposite.

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Acknowledgments

Mackenzie Presbyterian University, Mackpesquisa, Fapesp (2022-13908-0), Cnpq (PIBITI), and UNIGEL.