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Comparison of the mechanical and thermal properties of TiO₂ nanofiller and TiO₂ dispersed epoxy composites**Olusola Olaitan Ayeleru¹, Freeman Ntuli¹, Peter Apata Olubambi¹ and Williams Kehinde Kupolati²**¹University of Johannesburg, South Africa²Tshwane University of Technology, South Africa

The dispersion of nanofiller into the polymer matrix enhances the properties of polymers such as mechanical, thermal and electrical properties that are often lost when polymers are treated using incineration or landfilling. This paper aims to investigate the mechanical and thermal properties of polymer-based TiO₂ nanofiller and as-received TiO₂. This was achieved by dispersing the synthesized TiO₂ nanofiller and the as-received TiO₂ in epoxy resin and Diamino Diphenyl Methane (DDM) (as hardener) separately in two different molds at a temperature of about 80°C for 1 hour and allowed to cure. The molds were made to cool and the solid nanocomposites obtained were taken for the mechanical and thermal properties analysis. The tensile strength, hardness, elastic modulus and scratch hardness tests were evaluated. The TGA and DSC characterization were also investigated to observe the thermal property and the thermal degradation behavior of the samples. Results obtained showed an improvement in both the thermal and mechanical properties of the recycled polymer-based nanofiller.

olusolaolt@gmail.com