

SURFACTANT-FREE DIMER FATTY ACID POLYAMIDE/BENTONITE BIO-NANOCOMPOSITES

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ABSTRACT

Polyamide bio-nanocomposites were successfully prepared using a surfactant-free approach¹. The clay morphology was fixed by dispersing the ammonium ion-exchanged clay in acetic acid. This slurry was mixed with an acetic acid solution of the polyamide. The composite was recovered by precipitation with water. The composites featured a mixed morphology containing some exfoliated clay sheets together with nano-sized clay tactoids. Bio-nanocomposites containing as much as 27.5 wt% clay were obtained. At this filler level, and depending on the temperature, the modulus was up to nine times higher than that of the parent polymer. Addition of clay also increased the glass transition temperature by as much as 5 °C. This indicates that the high interfacial surface area, presented by the clay platelets dispersed in the matrix, significantly impaired the polymer chain mobility.

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References

¹Macheca, A. D.; Gnanasekaran, D.; Focke, W.W.; 2014. Surfactant-free dimer fatty acid polyamide/montmorillonite bio-nanocomposites. *Colloid and Polymer Science*, 292(3) 669-676. DOI: 10.1007/s00396-013-3122-7.