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## Effect of high impact loading on nanoclay reinforced polypropylene

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Except for a few attempts to show the high impact load effect, the difference in level of contribution of nanoclay on polymers at their quasi-static and dynamic mechanical behaviors is a lacuna in the available literature. Quasi-static and dynamic responses of a high impact copolymer Polypropylene (PP) in its neat and nanoclay-filled forms are presented in this study. The study helped in percentage quantification of differences in nano-clay effect, imposed by the very nature of loadings. The PP-nanoclay nano-composite (PP+5 wt% nc) is prepared by melt compounding of 5 wt% nanoclay (nc) with PP using twin screw extruder. Tensile specimens for UTM were prepared using injection molding machine. Dynamic loading specimens were made for Split Hopkinson Pressure Bar (SHPB) using an extruded sheet. The experiments were performed at strain rates of  $10^{-2} \text{ s}^{-1}$  and  $2.2 \cdot 10^4 \text{ s}^{-1}$  for quasi-static and dynamic loadings, respectively. As a result, the contribution of 5 wt% nanoclay on PP at quasi-static loading was shown to be 2.6%, 10.8% and 13% on yield stress, Young's modulus and toughness, respectively. However, significantly different results were observed after dynamic loading experiments. Intense improving contributions of 506% and 53% on impact modulus and impact toughness respectively were observed, while, minor reduction (3.5%) in plateau (yield) stress was experienced in the case of dynamic impact loading.

### Biography

Shishay Amare Gebremeskel has completed his BSc degree in Mechanical Engineering in 2008 and his MTech degree in Manufacturing Engineering in 2010. He has two years of teaching experience as a Lecturer at Bahir-Dar University in Ethiopia. He is now a PhD Research Scholar at Indian Institute of Technology Delhi (IITD) under the guidance of Prof. Naresh Bhatnagar in the Department of Mechanical Engineering. So far, he has published papers in three international journals.

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