

# Wood Flour-Polypropylene Composites: Structure-Property Relationships

*S.N. Maiti*

## **Abstract**

This presentation described the properties of wood flour-filled polypropylene composites on the basis of the fine structure of the polymer. The composite melts exhibited pseudoplastic behavior which increased with wood flour content. Melt viscosity increased and melt elasticity decreased with an increase in filler concentration, the latter property being advantageous in product fabrication. In the presence of wood flour the fibrillation tendency of polypropylene decreased, making the tensile fracture surface conchoidal. Wood flour particles imposed restrictions on the molecular mobility of the polymer, gradually shortening the stress-strain curves with increasing

filler-volume fraction. Tensile modulus increased and breaking elongation decreased for this reason. Tensile strength values decreased with increasing wood flour volume due to a decrease in crystallinity and an increase in stress concentration points. Up to a critical filler volume percent, Izod impact strength values increased, possibly on account of decreased crystallinity and sequential generation of tie molecules among the crystallites of the matrix polymer. Wood flour surface treatment with a titanate coupling agent modified the composite interphase, providing enhanced dispersion of the discrete phase and positive modification of the composite properties.

---

## **Maiti:**

Professor, Centre for Polymer Sci. and Engineering, Indian Inst. of Tech., New Delhi, India