

**Title:** A Study of the Effect of Drawing on the Thermal Conductivity of Polypropylene and Polystyrene

**Author:** Ochoo, Lawrence Otieno

**Abstract:** ABSTRACT The stretching effect on the thermal conductivity of isotactic polypropylene and atactic polystyrene samples, in the temperature range of 273K-333K. has been studied using the flash light method for measuring thermal conductivity. The processes and features involved in the heat conduction mechanism in polymeric materials have been analysed by considering factors like molecular chain conformation, bond strength, degree of crystallinity, the crystalline/amorphous boundary scattering effects and the contribution of the thermal conductivities of the individual phase. The results have shown that stretching caused the thermal conductivity in both polypropylene and polystyrene samples to increase along the draw direction, with the increasing draw ratio) while that in the perpendicular direction decreased. The thermal conductivity in isotropic and drawn polypropylene and polystyrene samples also increased with the increasing temperature, both along and perpendicular to the draw direction. It has also been observed that the thermal conductivity of polypropylene increases with the increasing degree of crystallinity. A model for analysing heat conduction in drawn semicrystalline polymers has also been proposed. based on the results for polypropylene obtained in this study. The model has been found to provide very good agreement with the experimental results obtained in this study) and for other semicrystalline polymers reported in the literature. It points that the thermal conductivity of an isotropic semicrystalline polymer is not--dependent on the thermal conductivity of the .. crystalline phase~ at high temperatures~ and that the boundary effects are negligible at high temperatures such as in the range of 273K-333K. ", 4> <, '.