DSC-RAMAN

"Strenghts of online coupling in polymer research"

Nylon 6 (polycaprolactam) is a polyamide that is widely used in the form of fibers. There are two crystalline forms, α and γ. The common α form has a fully extended planar zigzag conformation. The γ form differs in the hydrogen bonding between chains which produces a twisted gauche conformation about the C-N bond of the amide group. This change in conformation leads to significant differences in the Raman spectra of the two forms[1].

The crystallization behavior of nylon-6 is known to differ between virgin and previously extruded material. DSC measurements show that crystallization from the melt occurs at about 173^{o}C for virgin material but at about 185^{o}C for samples that have previously been extruded.

Combined Raman and DSC measurements provide different insights into thermally induced phase changes. In the case of semi-crystalline materials Raman data gives qualitative information about molecular conformations to complement the purely quantitative information from DSC. We have used this approach to study crystallization in nylon-6.