

STRUCTURE CHARACTERIZATION OF HIGH-STRETCHED POLYETHYLENE TEREPHTHALATE USING ATOMIC FORCE MICROSCOPY

Lisa Vsetecka, Birgit Neitzel and Sabine Hild

Institute of Polymer Science, Johannes Kepler University Linz, Altenberger Str. 69,
4040 Linz, Austria

Introduction

The microscopic structure of polymeric material has a big influence on its mechanical properties. An important characteristic variable is the glass transition temperature. Orientation and crystallinity of the polymer chains are influenced by temperature changes. For the characterization of such inner structure changes atomic force microscopy (AFM) is a proper tool.

Experimental

The focus of this investigation is on structures of high-stretched PET samples. After microtome cutting, the polished specimen surface is examined with AFM. The structure development is investigated after various temperature treatments. Due to different temperatures and stretching, varying fibril structures are formed.

Results and Discussion

The examination near to the surface shows narrower fibril layers compared to fibril layers found in a deeper measurement position. The different fibril layer distances are formed because of the various temperature zones in the bulk sample. The edge areas are cooled down much faster than the specimen center.

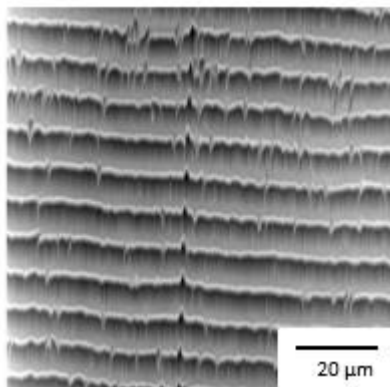


Figure 1: Narrow fibril layers at a surface-near position.

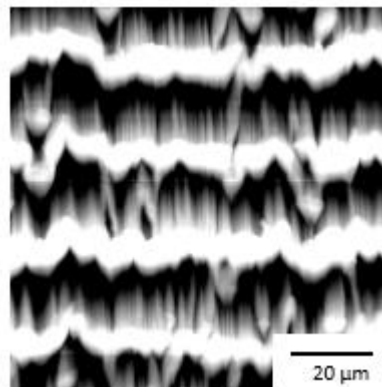


Figure 2: Wider fibril layers at a surface-distant position.