

Abstract Submitted
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Melting, Recrystallization and Superheating of Polymer Crystals Studied by Fast Calorimetry (1 MK/s)¹ CHRISTOPH SCHICK, ALEXANDER MINAKOV, ANDREAS WURM, EVGENY ZHURAVLEV, University of Rostock — For polymers the origin of the multiple melting peaks observed in DSC curves is still controversially discussed. This is due to the difficulty to investigate the melting of the originally formed crystals exclusively. Recrystallization is a fast process and most experimental techniques applied so far do not allow fast heating in order to prevent recrystallization totally. We developed a thin-film (chip) calorimeter allowing scanning rates as high as one million Kelvin per second. The calorimeter was used to study the melting of isothermally crystallized polymers like isotactic polystyrene (iPS), isotactic polypropylene (iPP), poly(ethylene terephthalate) (PET) and others. Our results on melting at rates as high as 1,000,000 K/s support the validity of a melting-recrystallization-remelting process at low scanning rates (DSC) for all studied polymers. At isothermal conditions they form crystals, which all melt within a few dozens of K slightly above the isothermal crystallization temperature. There is no evidence for the formation of different populations of crystals with significantly different stability (melting temperatures) under isothermal conditions.

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