

Abstract Submitted  
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**Vitrification and Devitrification of Rigid Amorphous Fraction of PET during Quasi-isothermal Cooling and Heating**<sup>1</sup> PEGGY CEBE, HUIPENG CHEN, Tufts University — Poly(ethylene terephthalate), PET, was studied by quasi-isothermal (QI) Temperature Modulated Differential Scanning Calorimetry (TMDSC). For the first time, both the temperature dependent crystalline fraction and rigid amorphous fraction (RAF) were quantitatively analyzed during QI cooling and reheating. Specific reversing heat capacity measurements show that most RAF vitrifies step by step during QI cooling after completion of crystallization. Upon subsequent QI reheating, the RAF devitrifies also step by step and only a small RAF of 0.04 remains at 470K, while melting starts above 473K. To obtain the exact temperature of the start of melting, heat capacity measurements were made using subsequent standard DSC heating, after QI cooling. By combining this method with the QI results, the temperature dependent phase fractions were obtained during standard DSC heating. We conclude that RAF completely devitrifies before the temperature reaches the crystal melting endotherm under the conditions used in this work.

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Huipeng Chen  
Tufts University

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