The Property of Semi Crystalline Polyethylene Oxide Doped with Sodium iodide

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Introduction

Flow induced crystallization (FIC) of semicrystalline polymer is not only a scientific issue but also is a vital factor in processing, it is generally accepted that flow field can remarkably accelerate the crystallization kinetics, especially enhance the nucleation process.

Since polyethylene oxide (PEO) has a unique character of solvating mental ions, especially the alkalis mental ions. Bruce and coworkers found the doped salts could form transient cross-linking points with the PEO chains through ions coordinating with the oxygen atoms of PEO, the phenomenon that cations coordinate generally with four ether oxygen atoms in PEO-salt complex has been observed. and thus change the state of entanglement network in the matrix.

Experiments and Data

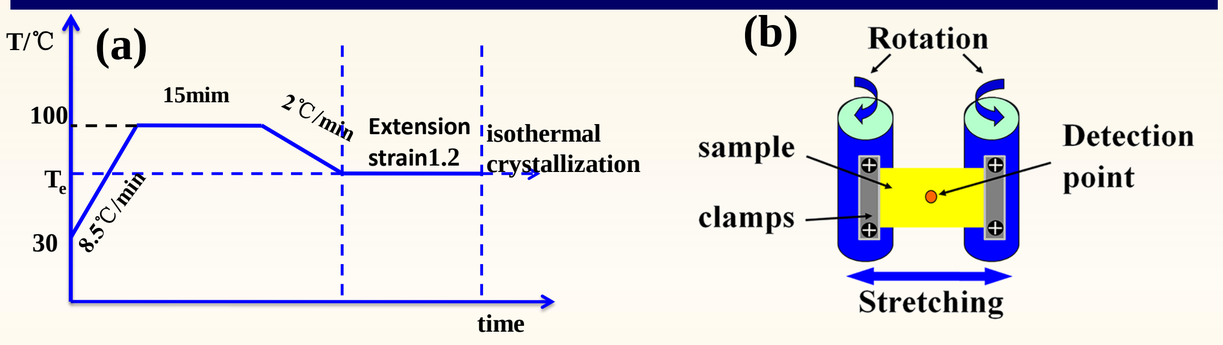


Figure 1. (a) Experimental procedure (b) procedure Schematic drawing of the extensional rheometer for in situ SAXS.

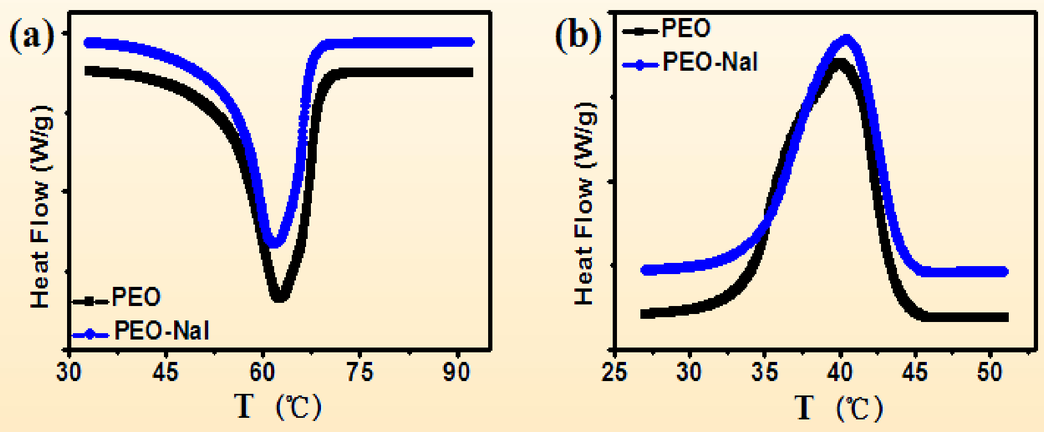
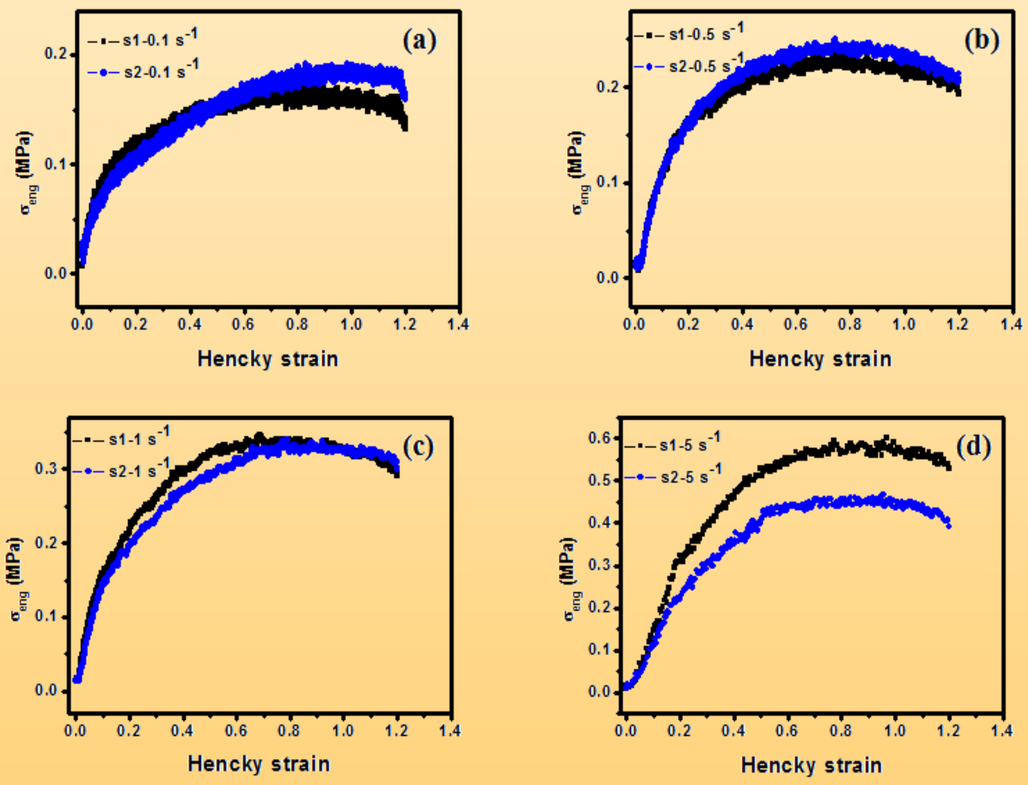


Figure 2. Differential scanning calorimetry thermograms of samples: (a) the second heating run. (b) The first cooling run.



Results and Discussion

Figure 3. Engineering stress-Hencky strain curves for pure PEO and PEO-NaI samples under a strain of 1.2 with different strain rates.

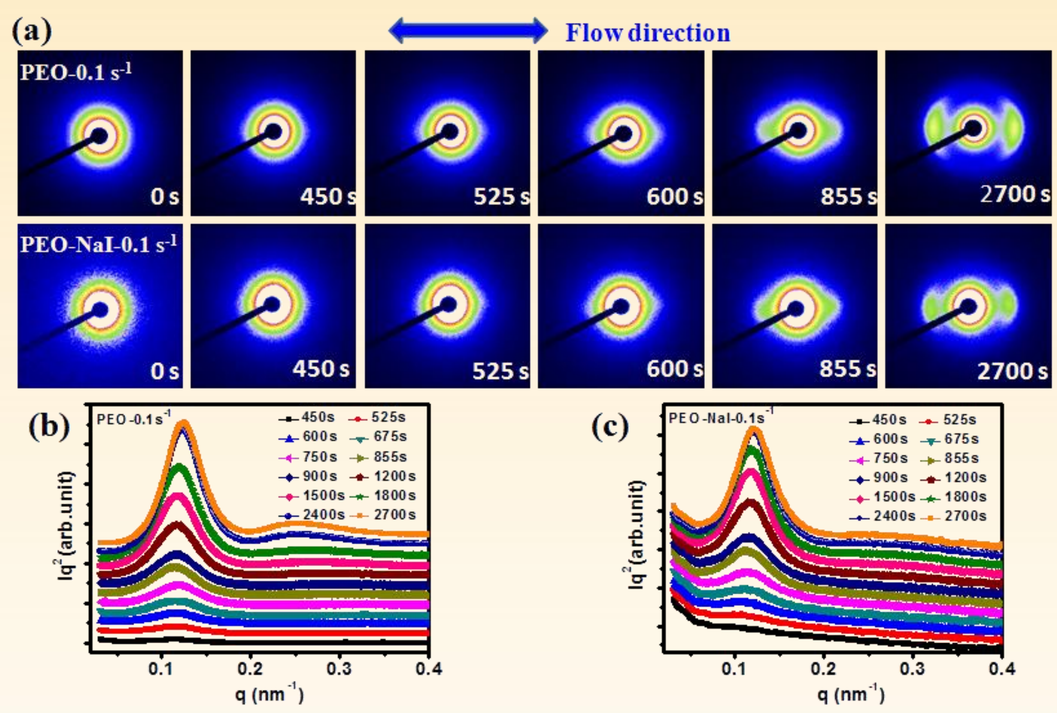


Figure 4. (a) 2D SAXS patterns of the PEO and PEO-NaI samples at selected time intervals after extension at 63 ℃ with a strain rate of 0.1 s^{-1}. (b) 1D SAXS intensity profiles of pure PEO (c) 1D SAXS intensity of PEO-NaI.

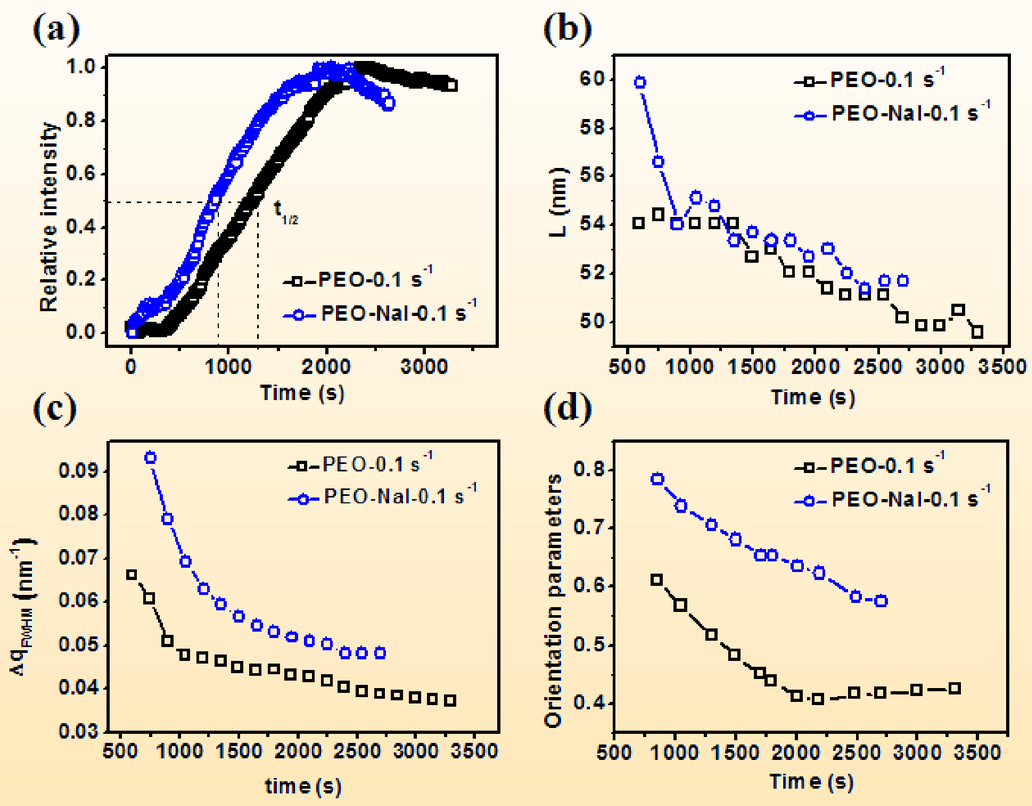


Figure 5. Plots of (a) normalized scattering intensity (b) long period of the lamellar crystals (c) the half peak width of 1D SAXS intensity (d) lamellar crystals orientation parameter of the pure PEO and PEO-NaI samples with crystallization time under the strain rate of 0.1 s^{-1}.

Outlook

In future

★ try to do some experiments about PEO doped with $ZnCl_2$ at different concentrations.

★ summarize the effects of salts on PEO.

★ make a logical analysis for the data and finish the first draft paper.

Acknowledgement: This work is supported by the National Natural Science Foundation of China (51033004) and the experimental fund of Shanghai Synchrotron Radiation Facility (SSRF).