

## **Trends in Thermo-Responsive Behavior of Lipophilic Polymers**

Priyanka Bhattacharya,<sup>†,1</sup> Uma Shantini Ramasamy,<sup>‡</sup> Susan Krueger,<sup>⊥</sup> Joshua W. Robinson,<sup>†,2</sup>  
Barbara J. Tarasevich,<sup>†</sup> Ashlie Martini,<sup>‡</sup> Lelia Cosimbescu<sup>\*,†</sup>

<sup>†</sup>Energy and Environment Directorate, Pacific Northwest National Laboratory, 902 Battelle Blvd, Richland, WA 99354, USA

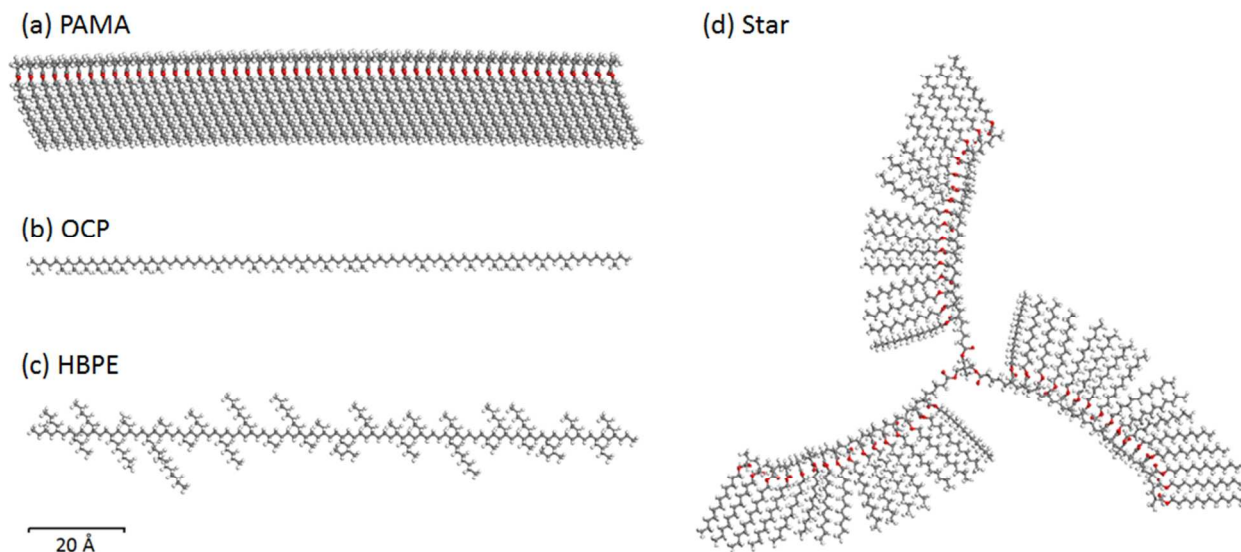
<sup>‡</sup>School of Engineering, University of California-Merced, California 95343, USA

<sup>⊥</sup>NIST Center for Neutron Research, NIST, 100 Bureau Drive, Stop 8562, Gaithersburg, MD 20899-8562, USA

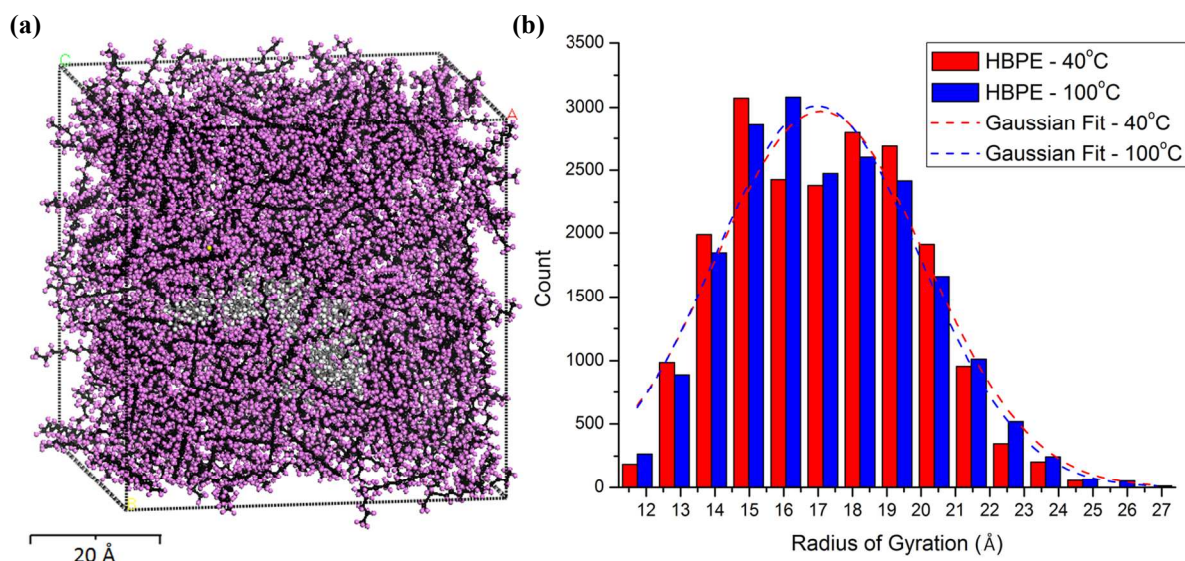
\*[lelia.cosimbescu@pnnl.gov](mailto:lelia.cosimbescu@pnnl.gov)

<sup>1</sup> Energy Technologies and Materials Division, University of Dayton Research Institute, 300 College Park, Dayton, OH, 45469-0076, USA

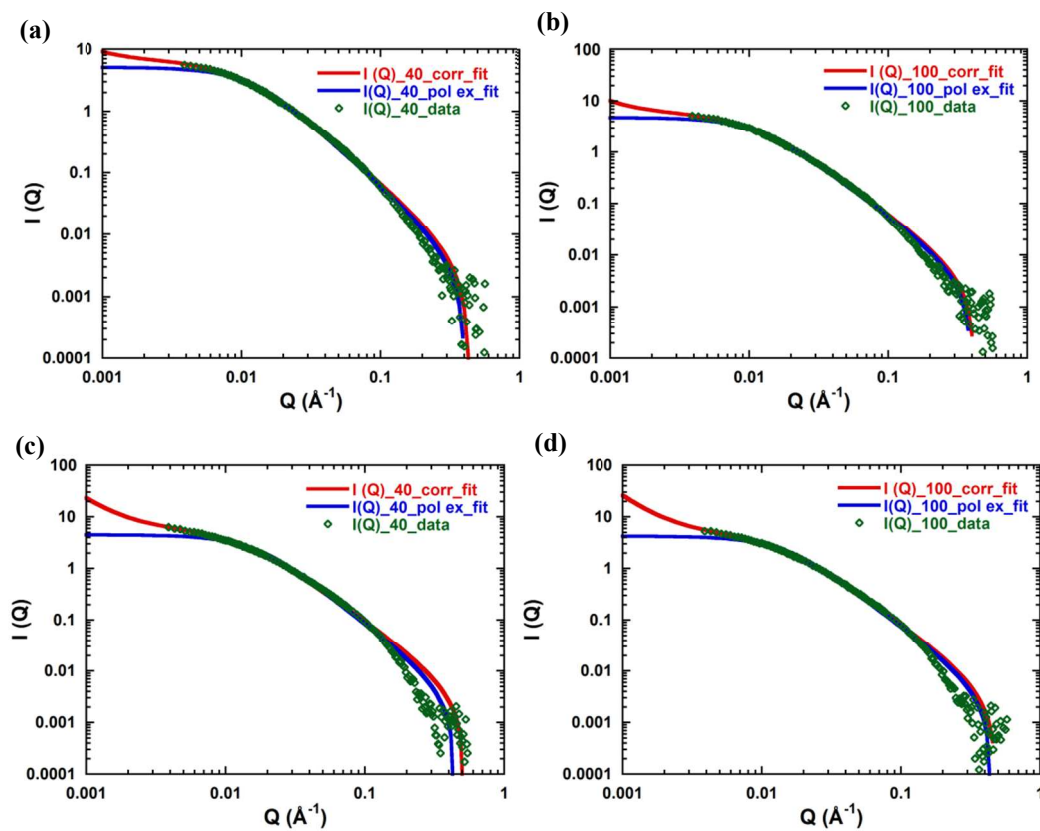
<sup>2</sup> USDA, Agricultural International Service, 4700 River Rd.; Riverdale, MD 20737; Office: 301.851.3826



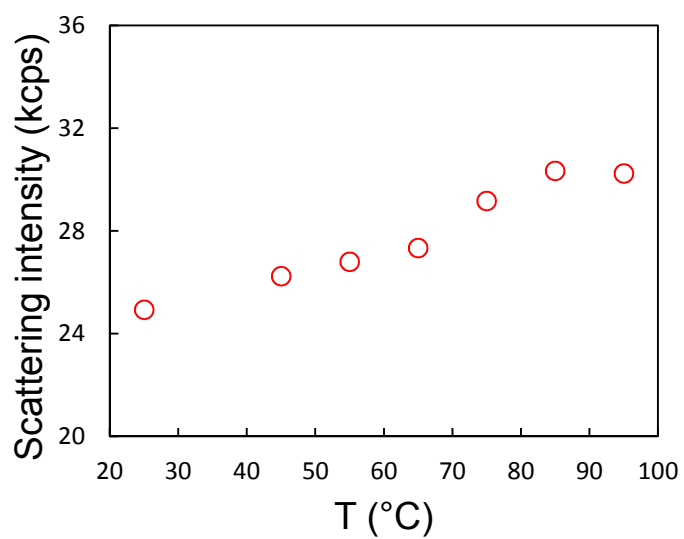
**Figure S1.** Molecular structures of (a) PAMA, (b) OCP, (c) HBPE, and (d) Star. For all structures, colored spheres represent individual atom types: grey – carbon, white – hydrogen, red – oxygen. The scale bar on the left applies to all structures.



**Figure S2.** (a) Initial configuration of HBPE in dodecane. The dotted lines represent the periodic boundary. The carbon and hydrogen atoms in dodecane are represented by black and purple spheres, respectively. The white spheres represent the HBPE polymer. (b) Representative histogram of the radius of gyration of HBPE at the two temperatures, which were fit to Gaussian functions to obtain the mean of the distribution.



**Figure S3.** Comparison between polymer excluded volume fit (pol\_ex\_fit) and correlation length model fit (corr\_fit) to the SANS data for (a), (b) HBPE and (c), (d) star polymers at 40 and 100 °C.



**Figure S4.** DLS determined scattering intensity (kilocounts per second) for the HBPE polymer as a function of temperature.

**Table S1.** Comparison Between Fit Results for Polymer Excluded Volume Fits (Pol\_ex) and Correlation Length Fits (Corr\_Length) to the SANS Data for the Polymers.  $n$  is the Porod Coefficient.

Sample	Pol_ex $R_g$ (nm)	Pol_ex $n$	Corr Length $L_c$ (nm)	Corr Length $n$
OCP 40 °C	13.6	1.85	---	---
OCP 100 °C	13.0	1.85	---	---
PAMA 40 °C	27.8	1.87	---	---
PAMA 100 °C	24.3	1.78	---	---
HBPE 40 °C	12.5	2.00	10.4	1.9
HBPE 100 °C	12.7	1.98	10.5	1.9
Star 40 °C	9.3	2.10	8.2	2.1
Star 100 °C	10.3	2.00	8.0	2.1