# Small Angle Neutron Scattering Study of Conformation of Oligo(ethylene glycol)-Grafted Polystyrene in Dilute Solutions: Effect of the Backbone Length

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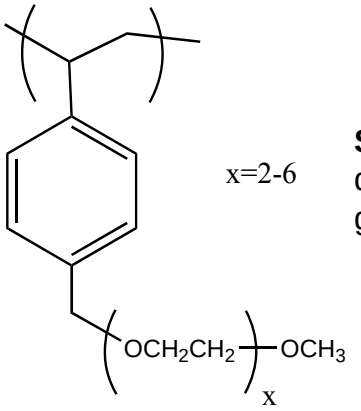
## Achievements

- We have discovered that the length of the backbone is a key factor in controlling the structure of amphiphilic comb-like polymers in various solvents.
- The influence of the hydrophobic phenyl end groups on polymer-polymer interactions becomes especially pronounced for short chains. That is, small chain lengths correspond to high relative concentrations of hydrophobic end groups, which can lead to a tendency for polymer-polymer aggregation on the nanoscale, especially in poor solvents for the end groups, like $D_2O$.
- These data shed fundamental light on the conformational changes and nanophase behavior of amphiphilic polymers on exposure to external stimuli, knowledge that is crucial to the development of a fundamental science foundation that will ultimately lead to novel biosensors, biometric actuators, and tunable surfaces with reversible hydrophobic and hydrophilic properties.




**Scheme 1** Structure of polystyrene densely grafted with oligo(ethylene glycol) $(OEG)_x$

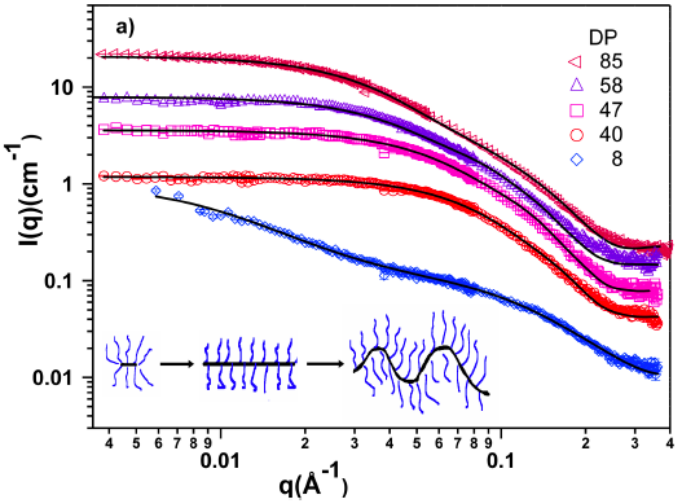



**Figure 1** The shape transition of the polymers in water with increasing backbone DP as determined by SANS.

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