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Self-assembly of alternating amphiphilic copolymers

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The self-assembly of amphiphilic copolymers with alternating hydrophobic and hydrophilic blocks has garnered much attention in recent years due to the wide range of nanostructures they can form, including micelles, vesicles, and gels. In this particular study, we focus on investigating the phase behavior of in-house synthesized Alternating Amphiphilic Copolymers (CnEGm) [1] in water using small-angle X-ray scattering (SAXS). Our findings demonstrate that the phase behavior of these copolymers is influenced by several factors, such as the length of the hydrophobic Cn- and the hydrophilic blocks EGm-blocks, as well as the overall molecular weight of the polymer. Additionally, we show that external parameters such as temperature, pH, and concentration can be used to control the phase behavior of these copolymers. Furthermore, we observe that the highly ordered structure of the gel formed by this polymer has not been previously reported, highlighting the importance of exploring the structure of this polymer for potential future applications.

[1] Kostyurina, E.; De Mel, J. U.; Vasilyeva, A.; Kruteva, M.; Frielinghaus, H.; Dulle, M.; Barnsley, L.; Förster, S.; Schneider, G. J.; Biehl, R.; Allgaier, J. Controlled LCST Behavior and Structure Formation of Alternating Amphiphilic Copolymers in water. *Macromolecules* 2022, 55, 1552–1565.

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