**“Schizophrenic” micelles from doubly and orthogonally switchable block copolymers**

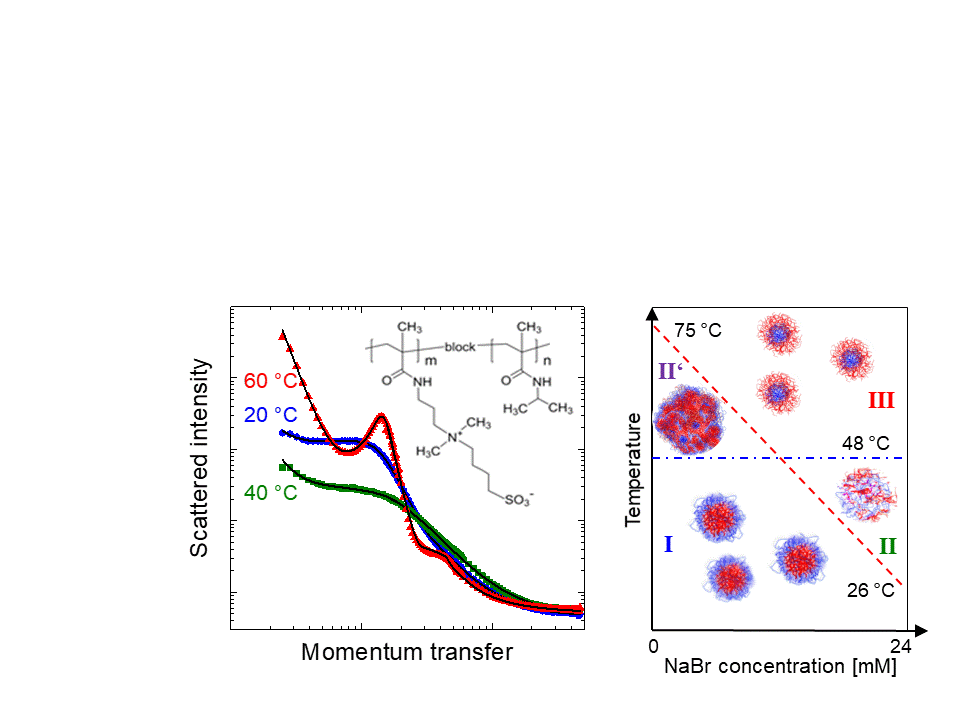
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Based on diblock copolymers, we designed “schizophrenic” micellar systems by combining a non-ionic block, which is thermoresponsive, with a zwitterionic block, which is thermoresponsive and salt-sensitive [1,2]. Compared to the classical amphiphilic block copolymers, these feature many more possibilities for smart transport and delivery purposes and may serve as smart emulsifiers. As the non-ionic block, we chose thermoresponsive polymers exhibiting lower critical solution temperature (LCST) behavior in aqueous solution. Their cloud point depends mainly on the chemical nature, but only weakly on molar mass and salt concentration. The zwitterionic block is a polysulfobetaine which features upper critical solution temperature (UCST) behavior with the clearing point depending on the chemical nature, molar mass and salt concentration. Altering the chemical nature of the two blocks and their molar masses allows controlling the relative position of the clearing point of the zwitterionic block and the cloud point of the nonionic block. This way, we have identified different types of phase behavior in dependence on temperature and NaBr concentration. Combining turbidimetry and small-angle neutron scattering, we have found that the overall phase behavior corresponds to expectations and were able to design a system in which the reversal of the micelles may proceed via the molecularly dissolved state or the precipitated state, depending on salt concentration.



1. N.S. Vishnevetskaya, V. Hildebrand, B.-J. Niebuur, I. Grillo, S.K. Filippov, A. Laschewsky, P. Müller-Buschbaum, C.M. Papadakis: **Aggregation Behavior of Doubly Thermoresponsive Polysulfobetaine-*b*-poly(*N*-isopropylacrylamide) Diblock Copolymers.** *Macromolecules* **49**, 6655-6658 (2016).

2. N. S. Vishnevetskaya, V. Hildebrand, B.-J. Niebuur, I. Grillo, S. K. Filippov, A. Laschewsky, P. Müller-Buschbaum, C. M. Papadakis: **"Schizophrenic" Micelles from Doubly Thermoresponsive Polysulfobetaine-*b*-poly(*N*-isopropylmethacrylamide) Diblock Copolymers**. *Macromolecules* **50**, 3985–3999 (2017).

3. N. S. Vishnevetskaya, V. Hildebrand, M. A. Dyakonova, B.-J. Niebuur, K. Kyriakos, K. N. Raftopoulos,   
Z. Di, P. Müller-Buschbaum, A. Laschewsky, C. M. Papadakis: **Dual Orthogonal Switching of the “Schizophrenic” Self-Assembly of Diblock Copolymers.** *Macromolecules* **51**, 2604-2614 (2018).