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Stimuli-Responsive Micelles from Amphiphilic Diblock Copolymers

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Stimuli-responsive block copolymers self-assemble in aqueous solution and respond to changes of their environment, rendering them useful as smart nanocarriers for drug delivery and gene therapy. In the present project, we investigate responsive micelles formed by PDMAEMA-***b***-PLMA or PDMAEMA-***b***-PLMA-***b***-POEGMA [1,2]. PDMAEMA is a weak cationic polyelectrolyte and responsive to pH, ionic strength and temperature, whereas PLMA is strongly hydrophobic, enabling the delivery of hydrophobic drugs. POEGMA is permanently water-soluble and improves biocompatibility. Dynamic light scattering on PDMAEMA70-***b***-PLMA39 revealed that, at pD 2.8, self-assembled structures form, whose relatively large size points to vesicle formation. At pD 7.8 and 10.4, additional large aggregates are present up to a certain temperature. Detailed structural information is obtained from small-angle neutron scattering (SANS) at KWS-2 at MLZ, confirming the differences of the micellar structures in acid or alkaline solution.

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