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Deuterated Acryl- and Methacrylamides as Monomers for Thermoresponsive Polymers

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In order to provide users of the neutron scattering instruments at the MLZ with the appropriate partially or fully deuterated materials, JCNS has started last year a deuteration service, primarily from our core competences of polymers, ethoxylation and organic synthesis.

Among the most requested building blocks for deuteration are monomers for the synthesis of thermoresponsive polymers from the acrylate and methacrylate families. In this presentation we will show our previously established route towards the synthesis of deuterated acryl- and methacrylamides. This procedure was utilized in the synthesis of fully deuterated N-isopropylmethacrylamide (NIPMAM), which was then employed by an MLZ-user for the preparation of partially deuterated microgels for SANS measurements.

In addition, we established a new efficient synthetic route towards deuterated N-isopropylacrylamide (NIPAM) from relatively cheap commercial precursors in only two steps. This route combines a Ritter reaction with a ruthenium-catalyzed proton-deuterium exchange and can be used to selectively deuterate the isopropyl group, the double bond or the entire molecule.

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