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## **Influence of Photoswitchable Molecules on the Swelling Behavior of Thermoresponsive Poly(Dimethylacrylamide) Films in Water Vapor under UV-Irradiation**

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In this study, we investigated the swelling characteristics of p(AzAm-co-DMAm) and p(AzPyAm-co-DMAm) thin films in both isomer states of the photoswitchable molecules azobenzene (Az) and azopyrazole (AzPy). In thin films, irradiation of the chosen photoresponsive polymers can influence the swelling behavior in water vapor and provide a method to precisely control water uptake, expansion, and morphology on the nanoscale. This makes them promising candidates for applications such as light sensors, photo-actuators and drug-delivery systems. From in situ time-of-flight neutron reflectometry measurements with high temporal resolution at the D17 instrument at ILL, we obtained depth-resolved data about the water distribution during swelling, drying and irradiation in the dry and swollen state, using our custom-built chamber which allows for precise control of humidity. We show that photoswitchable molecules in thin polymer films provide an effective method of altering macroscopic bulk properties in functional materials.

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