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

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In this study, we investigate the swelling characteristics of p(AzAm-co-DMAm) films in both isomer states of the photoswitchable molecule azobenzene (Az). The influence of UV-irradiation on the swelling behavior in water vapor is explored, aiming to control water uptake, expansion, and morphology on the nanoscale. The material holds promise for applications such as light sensors, photo-actuators, and drug-delivery systems. We use time-resolved FTIR spectroscopy to analyze group vibrations during swelling and irradiation, obtaining insights into the molecular interactions during the isomerization process. Additionally, by utilizing in situ time-of-flight neutron reflectometry on a thin film at the D17 instrument at ILL, we obtain time- and depth-resolved data about the water distribution. Our results reveal insights into how azobenzene moieties affect the microscopic properties of the polymer.

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