

## Poster Presentation

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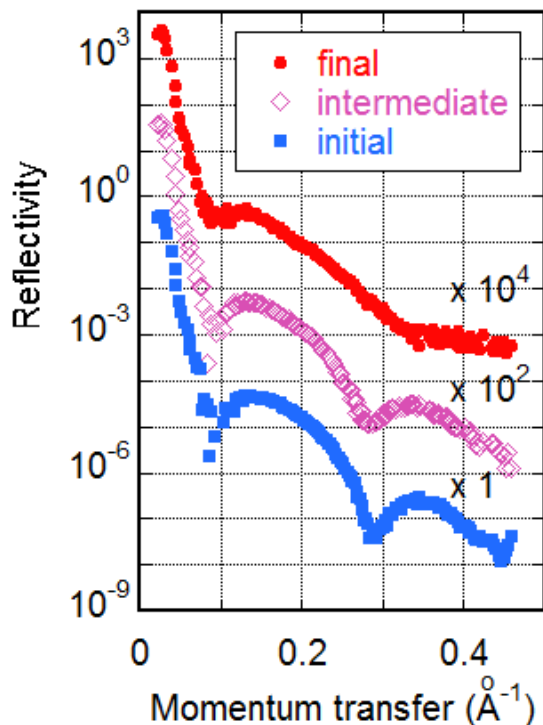
### Photoresponsive LB Films under Light Irradiation Observed by Time-Resolved XRR

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Langmuir-Blodgett (LB) films containing azobenzene undergo reversible structural change under light irradiation because of trans-to-cis or cis-to-trans transformations of azobenzene molecules. Such films are a candidate for molecular machines. Time resolved measurements of specular X-ray reflectivity (XRR) curves were carried out for polymer specimens of azobenzene-containing polyvinyl alcohol (6Az10-PVA) monolayer LB films on quartz substrates during light (365 nm or 436 nm) irradiation (1 mW/cm<sup>2</sup>). Measurements were performed with a time-resolution of 10 s using an X-ray reflectometer [1, 2], which can simultaneously measure the whole XRR curves with no need to rotate the specimen, detector or monochromator crystal. Profiles of XRR curves changed as a function of the elapsed time after initiation of the light irradiation reflecting the structural change of the film. Despite of a common belief that the photo-induced structural change occurs directly between the initial and final states, we found an evidence of the existence of the intermediate third structure. We also found that the time needed for changes in XRR curves was several times longer than for optical absorption spectroscopy (OAS) spectra reported with the same irradiation power. Details of such changes of XRR curves and structures of the film will be discussed and compared with the changes of OAS spectra. An XRR curve for the intermediate state of the 6Az10-PVA monolayer LB film specimen separated from the XRR curves measured under 365 nm light irradiation is shown in the figure together with curves for the initial and final states of the same specimen.

[1] T. Matsushita, E. Arakawa, W. Voegeli, et al, *J. Synchrotron Rad.* 20, 80 (2013)., [2] E. Arakawa, W. Voegeli, T. Matsushita, et al, *Journal of Physics: Conference Series (JPCS)* 425, 092002 (2013).



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