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In-situ Liquid Accessible Volume Measurement of Polymer Films Using Surface Plasmon Resonance YIBING ZHANG, MOHSEN YEGANEH, Corporate Strategic Research, Exxonmobil Research and Engineering Company — Many physical properties of a polymer in contact with liquid can be markedly affected by the amount of the liquid that can penetrate into the polymer matrix. The liquid accessible volume in a polymer matrix is difficult to determine at elevated temperatures and not possible with simple weight gain measurements. A high sensitivity optical Surface Plasmon Resonance (SPR) technique, which has been widely used in chemical and biomedical applications, was developed for determination of liquid accessible volume in a polymer matrix at both room and high temperatures (up to 150 °C). Experimental results and theoretical calculation are in excellent agreement. Hysteresis in liquid accessible volume as a function of organic liquid was observed when temperatures were cycled between room and high temperatures. The newly developed SPR technique for accessible volume determination has a great potential for *in-situ* characterization of a polymer matrix in contact with liquid.

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