ULTRA-THIN POLYMERS OF INTRINSIC MICROPOROSITY IN FLUIDS

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Polymers of Intrinsic Microporosity (PIMs) are widely regarded as having the potential to revolutionize such fields as molecular separations, catalysis or energy storage [1]. PIMs possess high microporosity often with pores similar to sizes of small gas molecules (3 – 6 Å) that enable effective "sieving" of gases and vapors. Such a structure forms naturally as a result of PIMs extremely rigid backbones that pack inefficiently in a solid state following deposition from a polymer solution. The easy processing of PIMs allows their introduction on a large industrial scale using the existing manufacturing facilities.

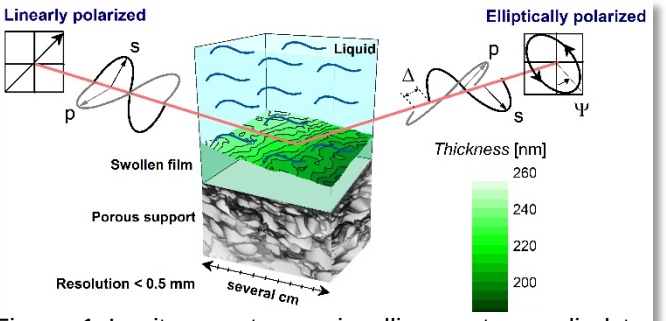

Figure 1 In-situ spectroscopic ellipsometry applied to directly image thin film composite

In this contribution, *in-situ* interference-enhanced ellipsometry is used to characterize ultra-thin (down to 6-7 nm) PIMs interacting with a variety of fundamentally and technologically important fluids including high pressure gases, liquids or vapors [2–4]. Next to characterization of thin PIM films ellipsometry is applied to study thin film composite membranes consisting of a selective skin deposited on a porous substrate [5]. Such geometry, highly unusual in typical ellipsometry analysis, mimics an actual highly efficient membrane that could be used in a large scale molecular separation plant.

Keywords: Polymers of Intrinsic Microporosity; In-situ Ellipsometry; Industrial Membranes

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