Poster Session

Title:	P. 13	**Asymmetric proton-conducting membrane made by photopolymerization**
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Abstract:		Proton-conducting membranes with interpenetrating polymer network morphology have been a subject of growing interest in recent years for potential use in direct methanol fuel cells. These materials are generally prepared by either in situ polymerization and cross-linking starting from initial reactants, or by sequential synthesis starting from a polymer network swollen with necessary precursors that subsequently react to form the interpenetrating structure within the first network. An interplay of the chemical reaction and liquid-liquid demixing kinetics has a determining effect on the final membrane morphology. Interpenetrating domains of relatively small size are typical, as opposed to macroscopic phase separation observed in most polymer blends. Such fine morphology of interpenetrating proton-conducting membranes often leads to improvement in mechanical strength and methanol barrier properties. Novel asymmetric membranes comprising proton-conducting channels of cross-linked sulfonic acid functionalized ionomers embedded within a matrix of thermally resistant, glassy polymer were prepared by photopolymerization and evaluated in our laboratories. These membranes have an integral top skin layer with fine biomimetic proton-conducting channels, which provides a barrier against methanol crossover, on top of a coarser proton-conducting support. Conductivity of asymmetric membranes over a range of initial polymer concentrations and ion-exchange capacities (IEC) was just slightly lower than for the corresponding symmetric membranes.