Abstract Submitted
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Liquid crystalline polymer electrolyte membranes with ion gating properties[1] JINWEI CAO, CAMILO PIEDRAHITA, Univ of Akron, KAGAMI KOTERASAWA, Kyoto Institute of Technology, ABEGEL FREEDMAN, JULIANA MARTINS, THEIN KYU, COLEEN PUGH, Univ of Akron, KAORU ADACHI, YASUHISA TSUKAHARA, Kyoto Institute of Technology — Polymer electrolyte membranes (PEMs) with ion conducting channels have been fabricated via photo-polymerization of liquid crystalline monomers, synthesized in our laboratory. The monomers consist of polyethylene glycol segments as the ion conduction medium and photoactive azobenzene mesogen. Guided by the phase diagram of azobenzene LC and nematic LC, ion conducting channels are formed in the liquid crystalline phases. Ionic conductivities of the azobenzene LCs were measured in trans-state and cis-state using AC impedance spectroscopy. By applying UV or visible light, the opening/closing of ion channels may be controlled through rapid trans-cis isomerization of azobenzene mesogen by light irradiation. Therefore, the ion conduction ability of the PEMs can be optically controlled, affording ion gating capability of the PEMs. These PEMs can act as the ion conducting channels on cell membranes and, therefore, may be used to construct artificial neurons. Supported by NSF-DMR 1502543

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