

# Proton dynamics in polymeric electrolyte membranes for high-temperature fuel cells: incoherent neutron scattering study

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Polybenzimidazole (PBI) membranes attract increasing interest as electrolytes for high-temperature polymer fuel cells with a typical operation temperature of 160°C. After being loaded with phosphoric acid PBI membranes provide very good proton conductivity which increases with an increasing amount of acid in the system. Additionally, such membranes show good chemical resistance and high glass transition temperature (~700 K). Although this kind of material has been already studied macroscopically (conductivity, rheology etc.), the microscopic dynamics has not been investigated in detail except from some molecular dynamic simulations. The neutron scattering techniques offer a new window to reveal the microscopic processes which are related to electrical ion conduction and allow to study the dynamics of protons and the polymer matrix separately. The Q-dependence of the scattering provides additional information about the system. Recent backscattering and neutron spin-echo (NSE) results will be presented.

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