Electronic Supplementary Information for

A new interpretation of SAXS peaks in sulfonated poly(ether ether ketone) (sPEEK) membranes for fuel cell

H. Mendil-Jakani*, I. Zamanillo Lopez, P. M. Legrand, V. H. Mareau and L. Gonon

Structure et Propriétés d’Architectures Moléculaires, UMR 5819 SPrAM (CEA-CNRS-UJF), CEA-Grenoble, 17, rue des Martyrs, 38054 Grenoble, Cedex 9, France.

*corresponding author: hakima.mendil-jakani@cea.fr

Impact of the IEC on the crystallinity

The fact that a small-angle matrix peak can be observed for semi-crystalline membranes has been previously established for perfluorosulfonated ionomers.\textsuperscript{1,2}

The supporting information displays the WAXD spectra of sPEEK membranes for different IEC.

WAXD spectra of sPEEK(1.2)(\textcircled{○}), sPEEK(1.33)(\textbullet), sPEEK(1.6)(\triangle), sPEEK(1.8)(\bigcirc) membranes in H\textsuperscript{+} form, after 96h of immersion at 80°C. The spectra were recorded in transmission geometry at room temperature and humidity.

The sPEEK(1.2) and (1.33) WAXD spectra clearly exhibit a sharp crystalline peak, located at about 1.37 Å\textsuperscript{-1}, this peak being superimposed to an amorphous halo centered around 1.6 Å\textsuperscript{-1}.
sPEEK membranes with similar degrees of sulfonation already showed crystallinity\textsuperscript{3}. For sPEEK(1.6) and sPEEK(1.8), one can observe that the WAXD profiles broaden. The crystalline peak of sPEEK(1.6) is very weak, whereas only the amorphous halo remains for sPEEK(1.8).

References