**Supporting information**

Crosslinked terpolymers of vinylidene fluoride, perfluoro-3,6-dioxa-4-methyl-7-octene sulfonyl fluoride, and cure site monomers for membranes in PEMFC applications

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![Fig. S1](image_url) 

**Fig. S1** $^{19}$F NMR spectra of PFSVE and hPFSVE monomers. Hydrolysis by KOH in MeOH and after HCl, recorded in acetone-$d_6$ at 20 °C.
Fig. S2 $^1$H NMR spectrum of poly(VDF-ter-PFSVE-ter-CNVE) terpolymer from a conventional radical terpolymerization of VDF with PFSVE and CNVE initiated by TBPPi at 73 °C in DMC (P5 terpolymer, Table 1), recorded in acetone-$d_6$ at 20 °C. The signals at 2.05 ppm was assigned to acetone.
Fig. S3 $^{19}$F NMR spectrum of poly(VDF-ter-PFSVE-ter-CNVE) terpolymer from a conventional radical terpolymerization of VDF with PFSVE and CNVE initiated by TBPPi at 73 °C in DMC (P5 terpolymer, Table 1), recorded in acetone-$d_6$ at 20 °C.
Fig. S4 ATR-IR spectra of poly(VDF-ter-PFSVE-ter-CNVE) terpolymer (P7, blue), poly(VDF-ter-PFSVE-ter-CNVE) crosslinked at 240 °C (P7T240, orange), hydrolysed 5 hours poly(VDF-ter-PFSVE-ter-CNVE) (PH5, grey) and hydrolysed 20 hours poly(VDF-ter-PFSVE-ter-CNVE) (PH6, yellow) (P7, Table 1, PH5 and PH6 Table 2).
**Fig. S5** Hastelloy autoclave Parr System 50 mL, equipped with a Bourdon pressure gauge, a rupture disk, inlet and outlet valves and an electronic device regulated and controlled both the stirring and the heating of the autoclave.
**Fig. S6** Press having two independent heating plates ranging from 20 to 300 °C, controlled by a regulator, a hydraulic jack equipped with an oil pressure manometer from 0 to 400 bar and two steel plates.
Fig. S7 Pictures of membranes after crosslinking, thermic tests: P11T240 (left), P11T220 (middle) and P11T200 (right)
**Fig. S8** Photos of BT-512 BekkTech Conductivity Test System which includes a Keithley 2400 Sourcemeter