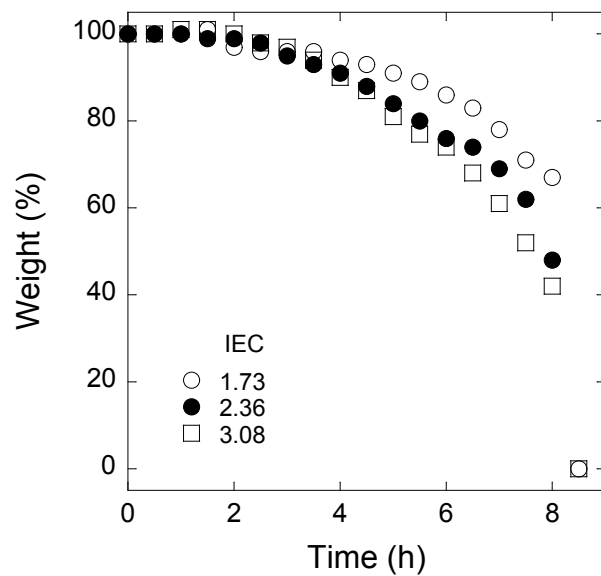


**Fig. S1** XRD spectra of PEEK-PEMs with IECs of 1.73-3.08 mmol/g. The separated peaks attributing to amorphous halo and (110), (111), and (200) planes of PEEK with an amorphous PSSA graft peaks were shown as dotted lines.



**Fig. S2** Change in the relative weight of PEEK-PEMs with IECs of 1.73, 2.36, and 3.08 mmol/g in Fenton's reagent (3% H<sub>2</sub>O<sub>2</sub>, 2 ppm FeSO<sub>4</sub>) at 80 °C.