Electronic Supplementary Material (ESI) for RSC Advances.

The chemical structures of imidazolium-based ILs

The chemical structures of the synthesized imidazolium-based ILs were determined by ^{1}H NMR spectroscopy using a Bruker ARX400 spectrometer at room temperature with deuterated water (D_2O) as the solvent. The detailed ^{1}H NMR spectra of the synthesized imidazolium-based ILs shown in Figs. S1-S7 was in agreement with the designed structures.

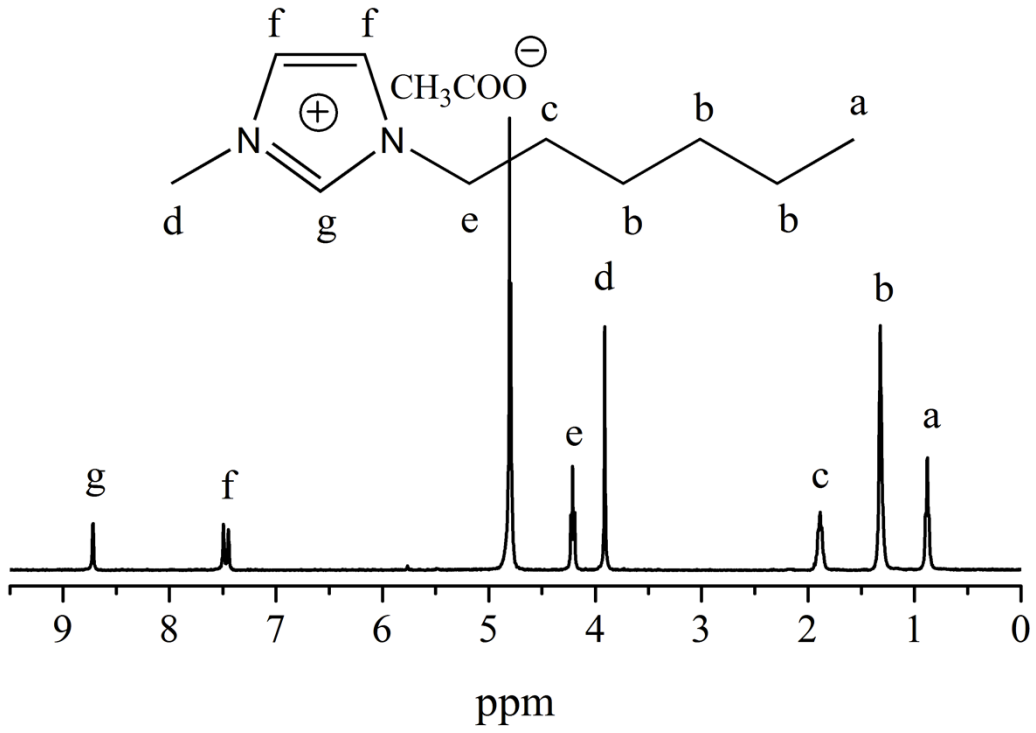

Fig. S1. ^{1}H NMR spectrum of [C_6MIM][CH_3COO]

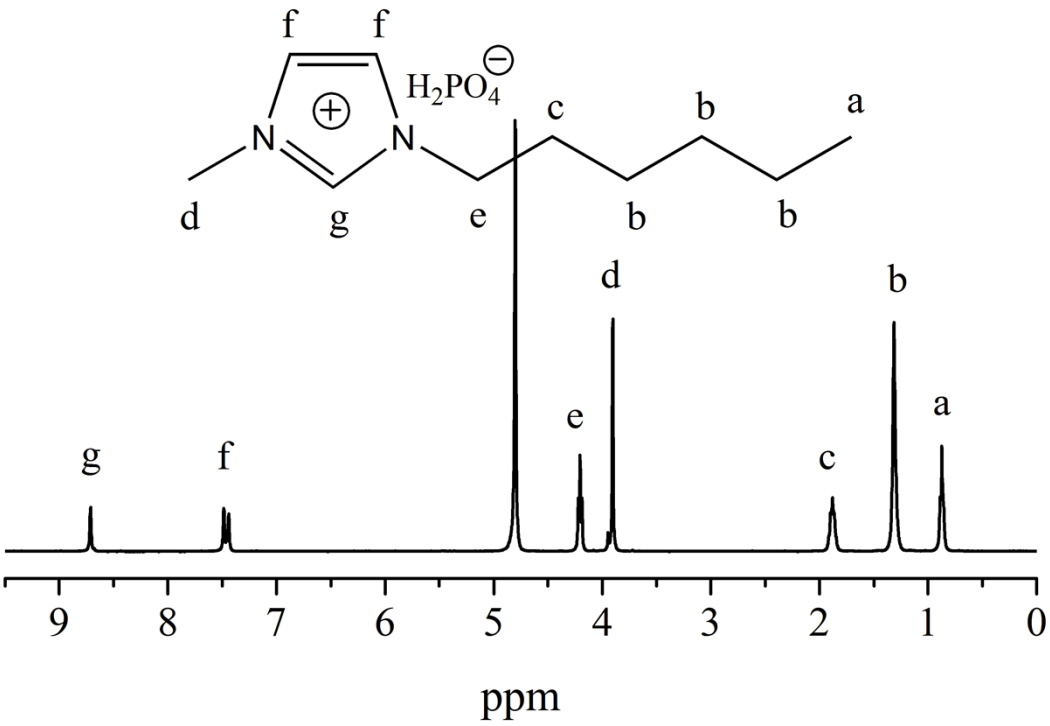

Fig. S2. ^{1}H NMR spectrum of [C_6MIM][H_2PO_4]

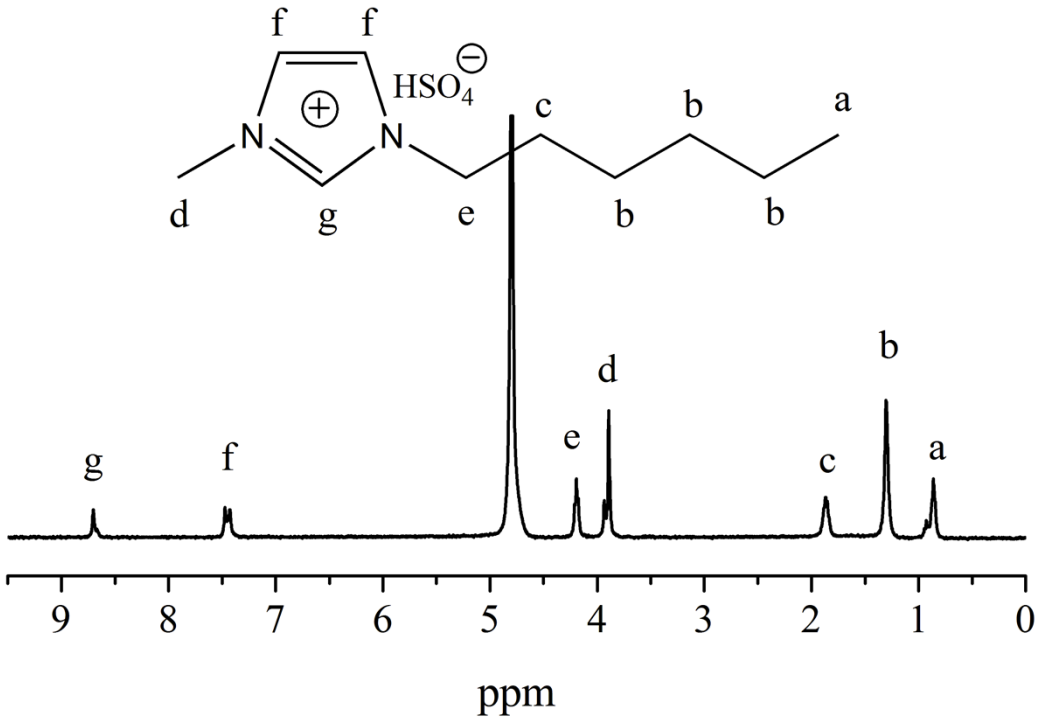

Fig. S3. ^{1}H NMR spectrum of $[C_6MIM][HSO_4]$

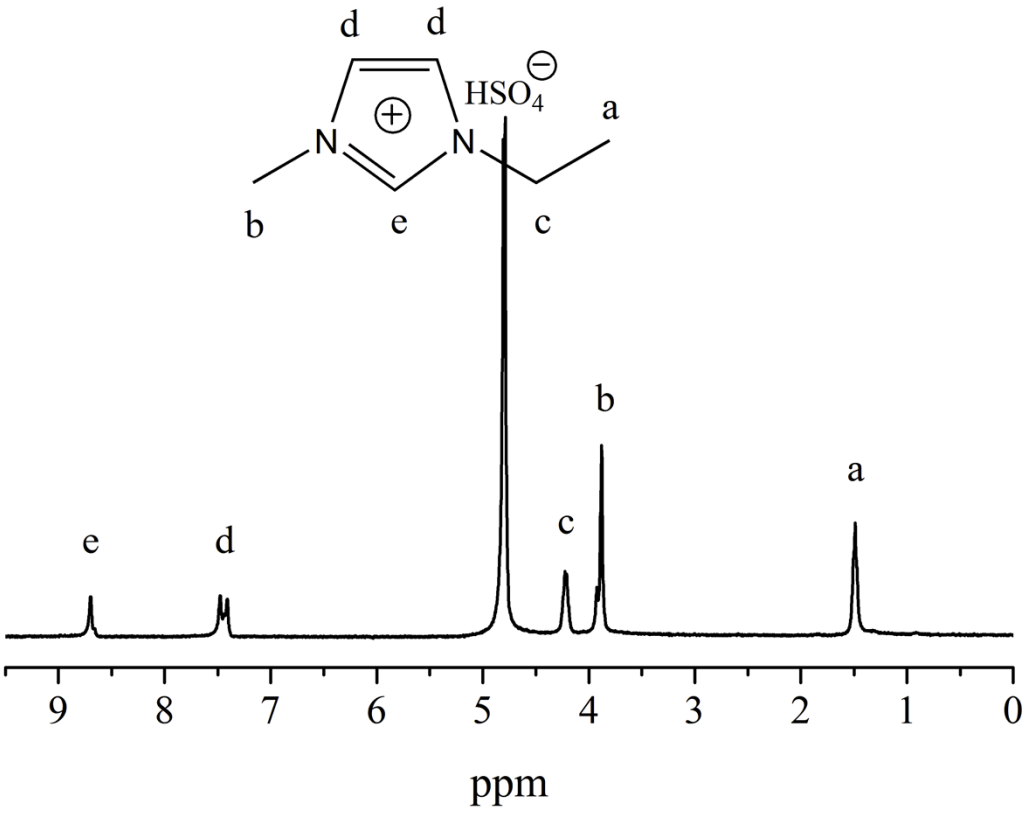

Fig. S4. ^{1}H NMR spectrum of $[C_2MIM][HSO_4]$

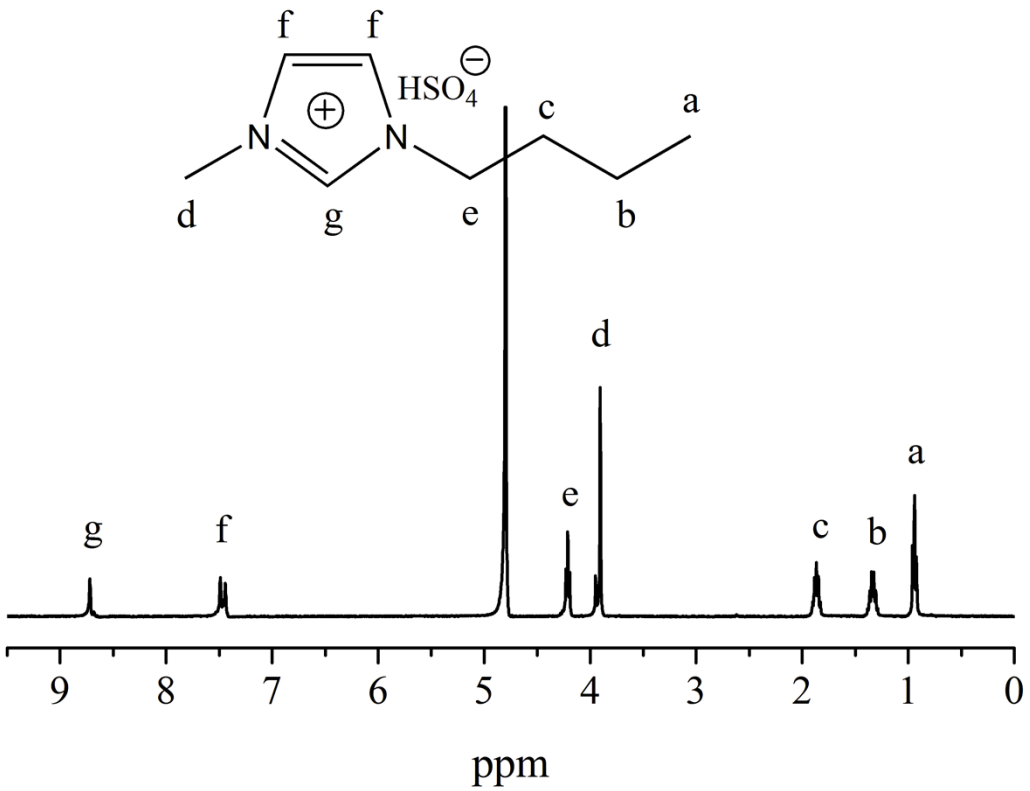

Fig. S5. ^{1}H NMR spectrum of $[C_4MIM][HSO_4]$

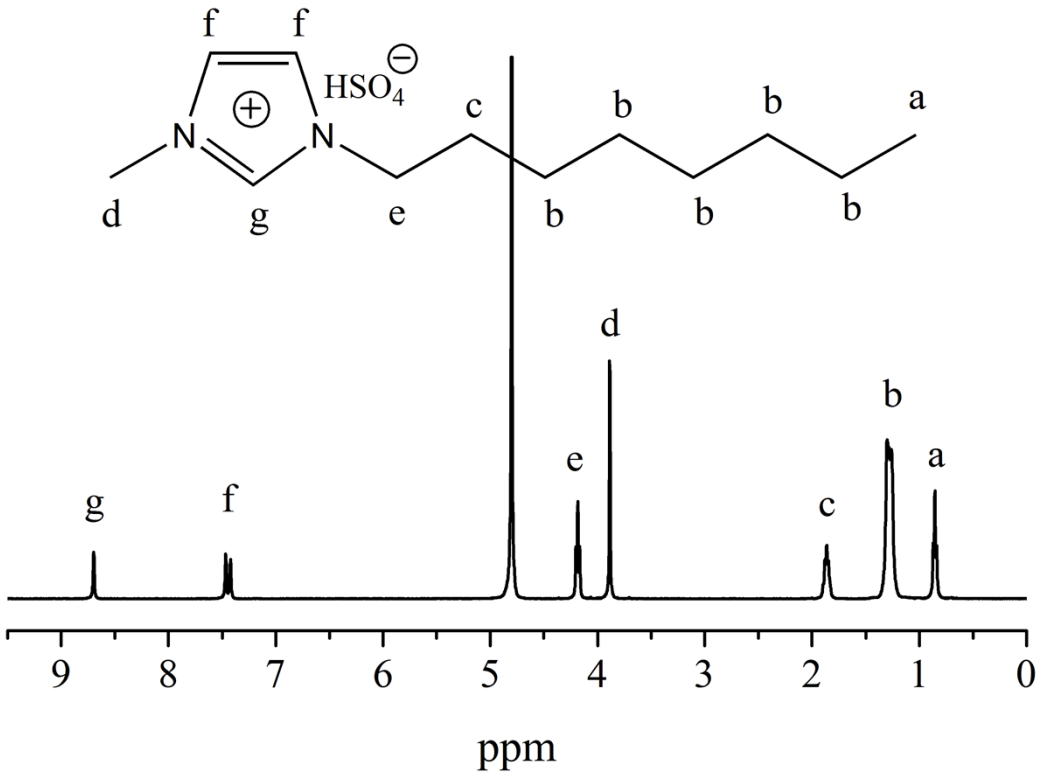

Fig. S6. ^{1}H NMR spectrum of $[C_8MIM][HSO_4]$

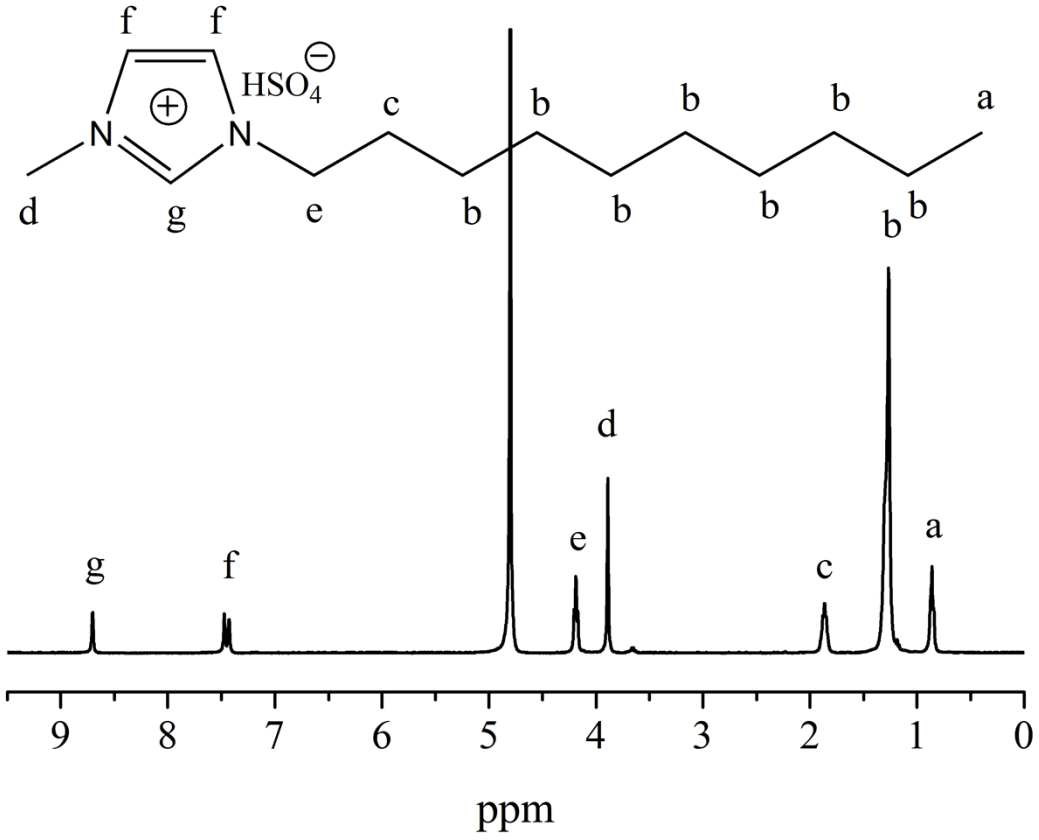

Fig. S7. ^{1}H NMR spectrum of $[C_{10}MIM][HSO_4]$

The acidity measurement

The Brønsted acid scales of the synthesized imidazolium-based ILs were determined using a Cary 5000 UV-vis spectrophotometer with a basic indicator according to the previously reported Hammett method. 4-Nitroaniline (5 mg/L, p*K*(I)aq = 0.99) was chosen as the basic indicator in water, and the concentration of each IL was 27 mmol/L. The detailed absorbances of the unprotonated form of the indicator with different IL in water were shown in Figs. S8 and S9.

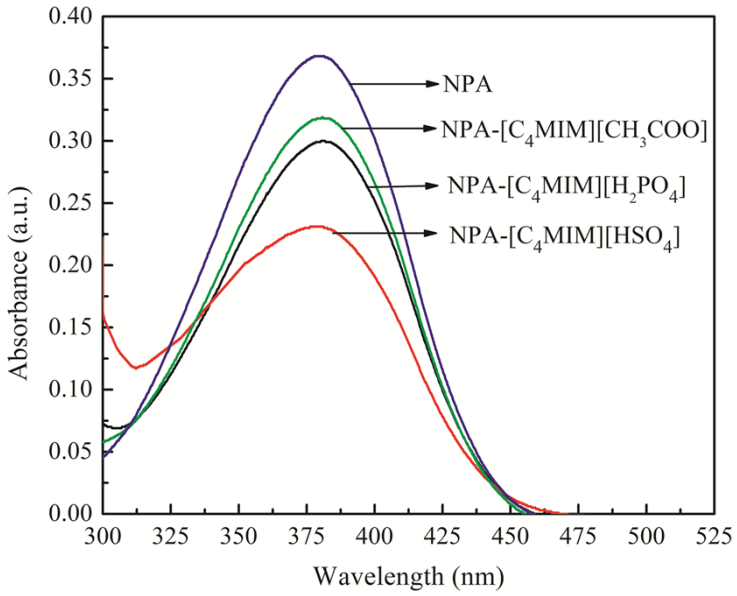

Fig. S8. Absorbance spectra of 4-nitroaniline (NPA) for BAILs with various anions in water

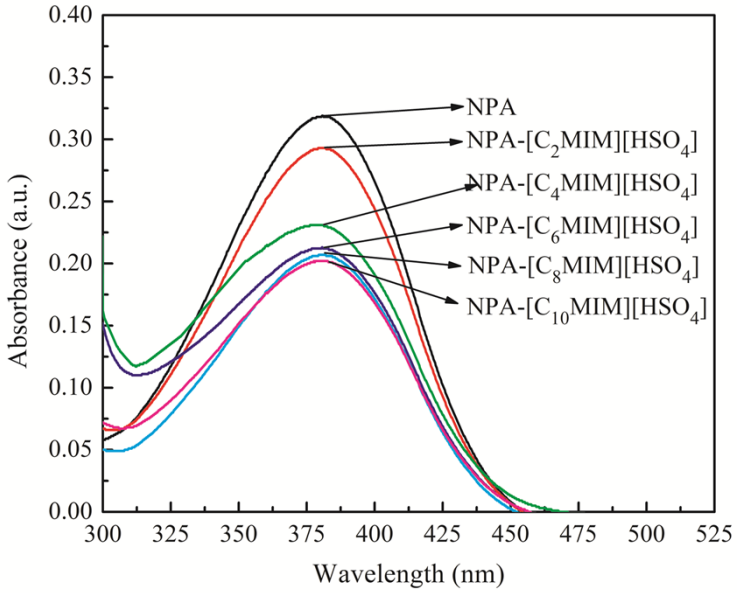

Fig. S9. Absorbance spectra of 4-nitroaniline (NPA) for BAILs with various cations in water

The characterization of Bisphenil F

The Bisphenil F is confirmed by the GC-MS analysis as shown in Fig. S10. The peaks of Bisphenil F are composed of three isomer peak of 2,2'-isomer (a), 2,4'-isomer (b) and 4,4'-isomer (c) with retention time of 22.8, 23.0, 23.5 min., respectively.

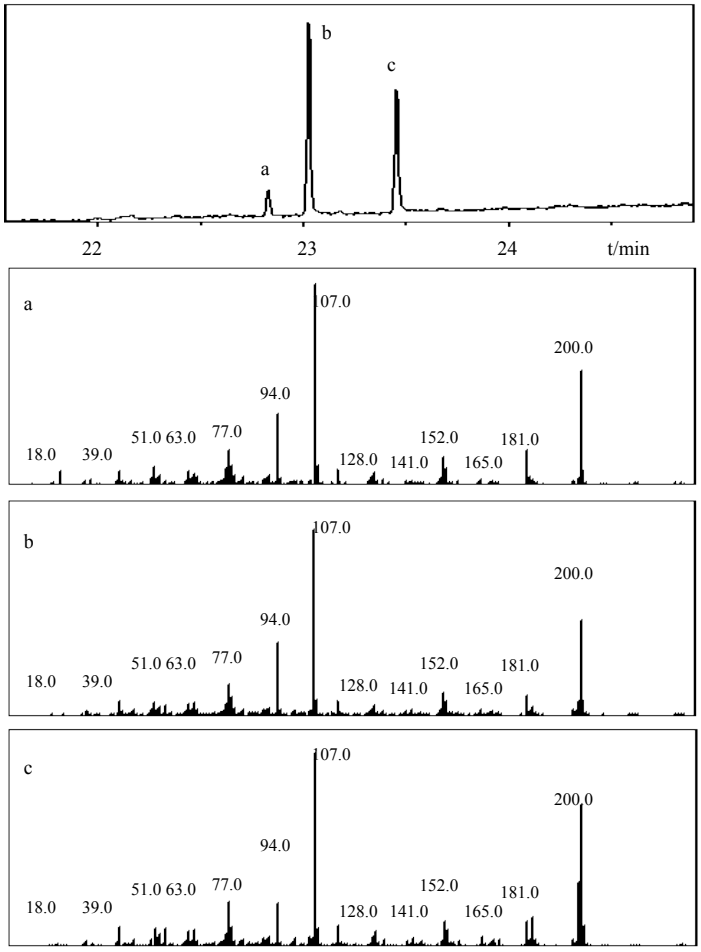

Fig. S10. GC-MS spectra of bisphenol F product