Electronic Supplementary Material (ESI) for RSC Advances.

Supporting information

Designing of sulphonic acid functionalized benzimidazolium based poly(ionic liquid) for efficient adsorption of hexavalent chromium

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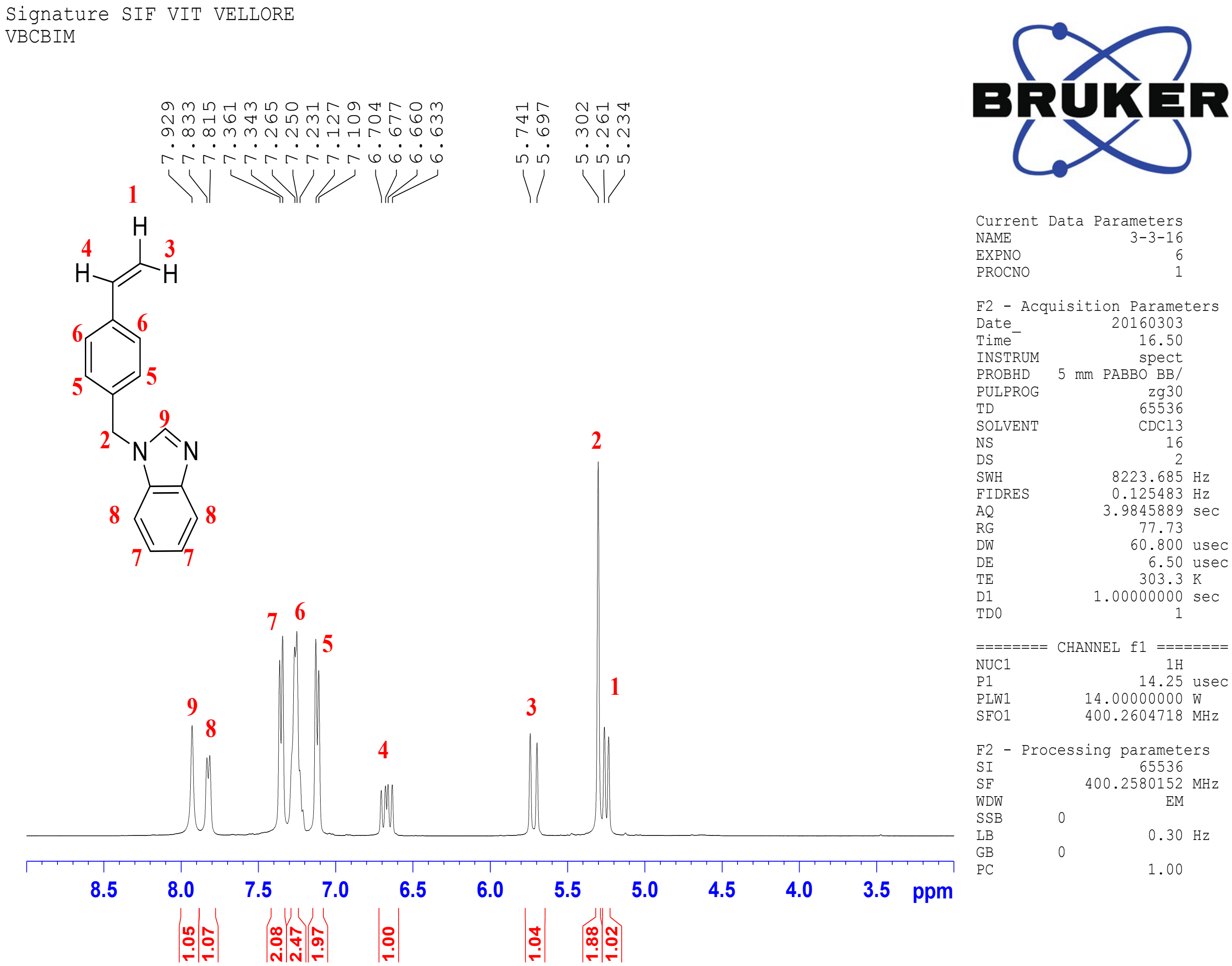

Fig. S1: ^{1}H NMR spectrum of 1-(4-Vinylbenyl)-1H-benzimidazole ($CDCl_3$).

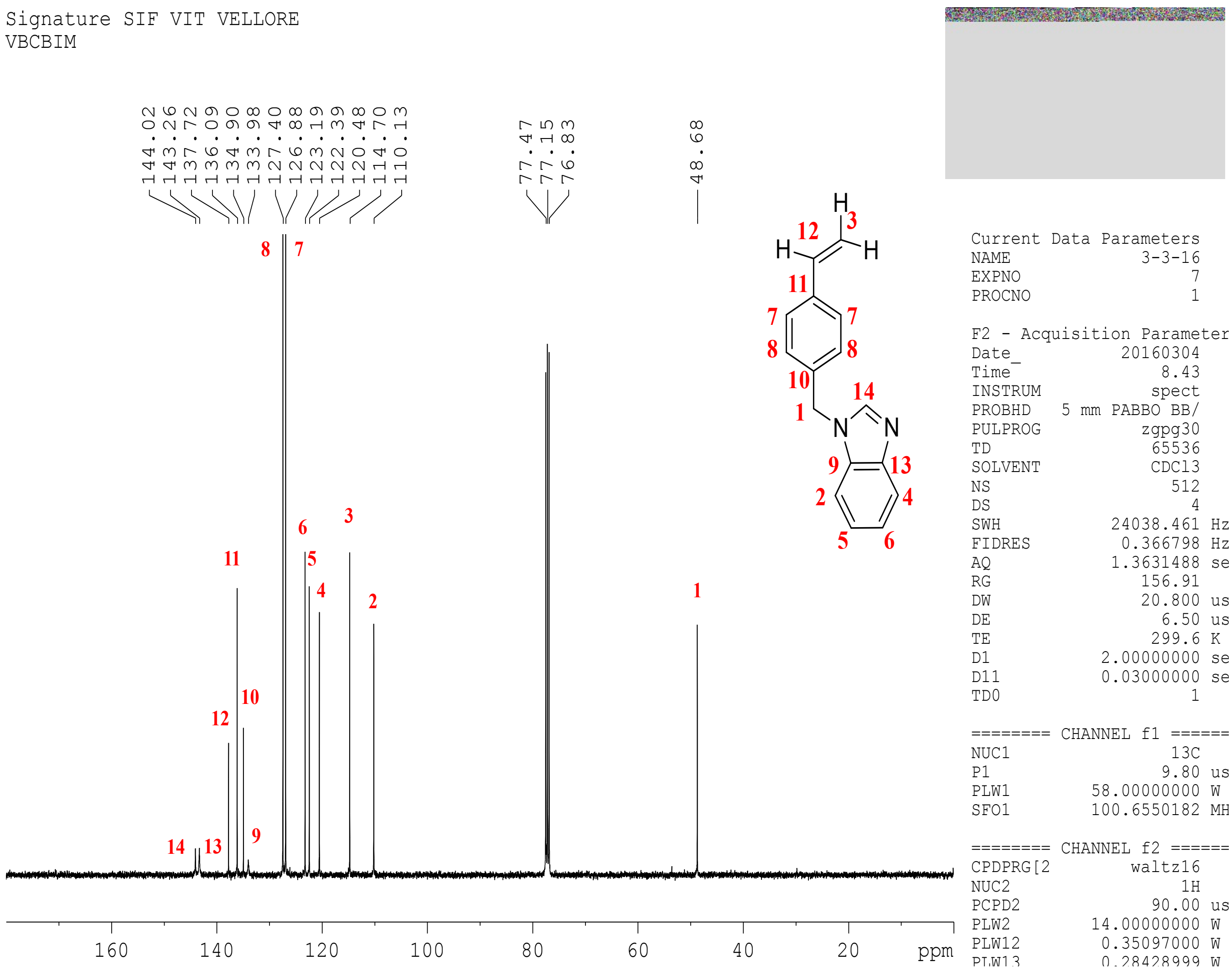

Fig. S2: ^{13}C NMR spectrum of 1-(4-Vinylbenyl)-1H-benzimidazole ($CDCl_3$).

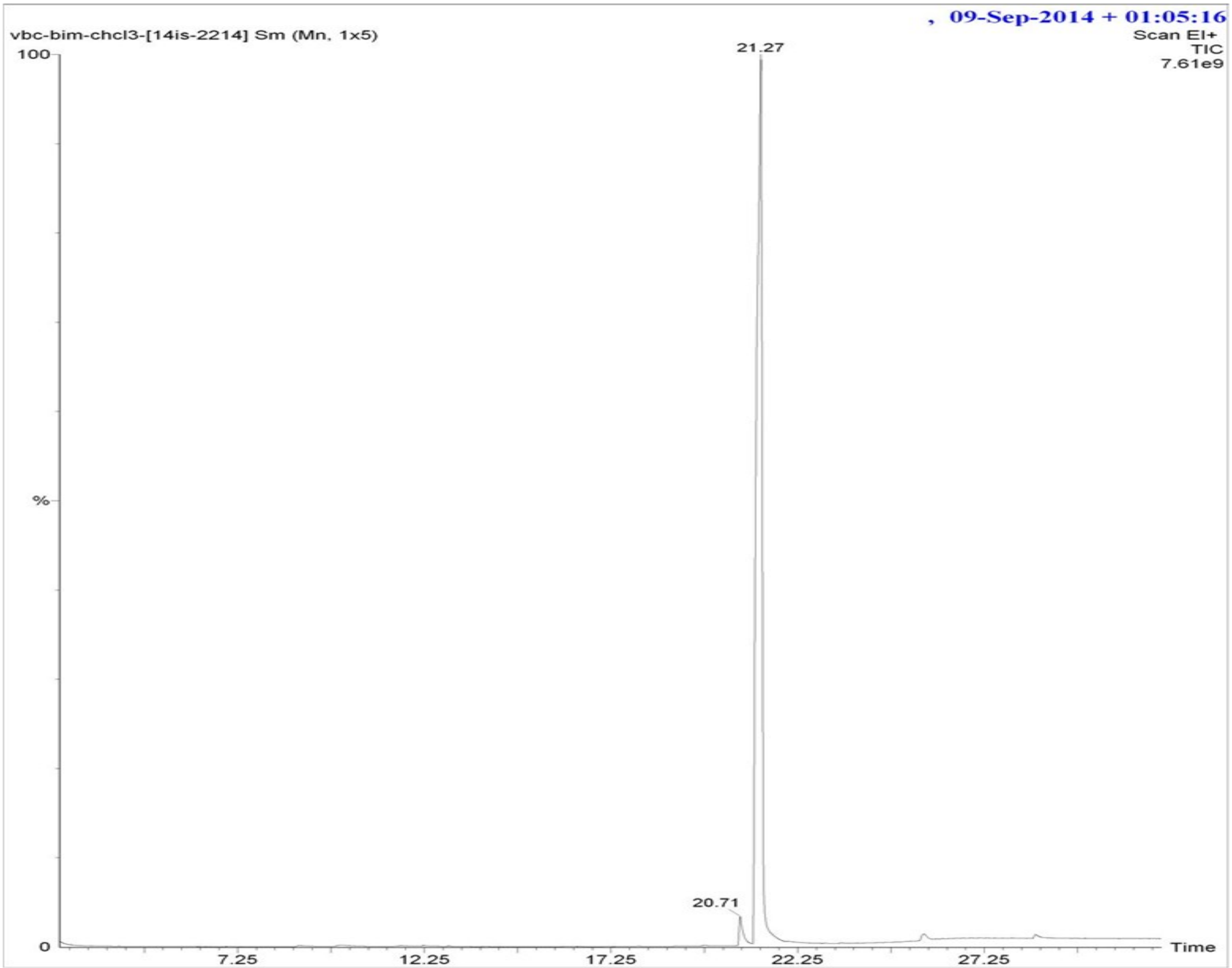

Fig. S3: Chromatogram of 1-(4-Vinylbenyl)-1H-benzimidazole.

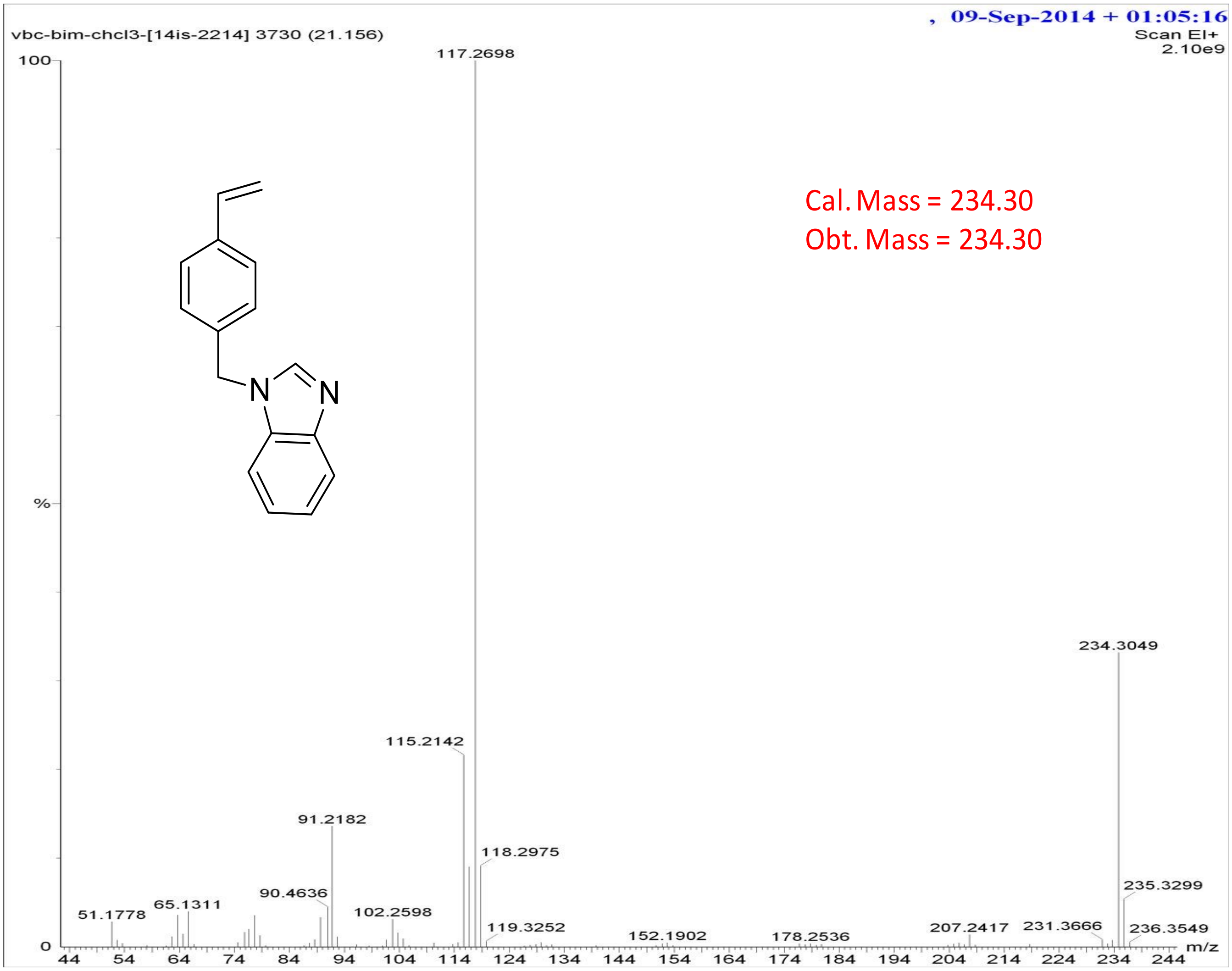

Fig. S4: GC-MS spectrum of 1-(4-Vinylbenyl)-1H-benzimidazole.

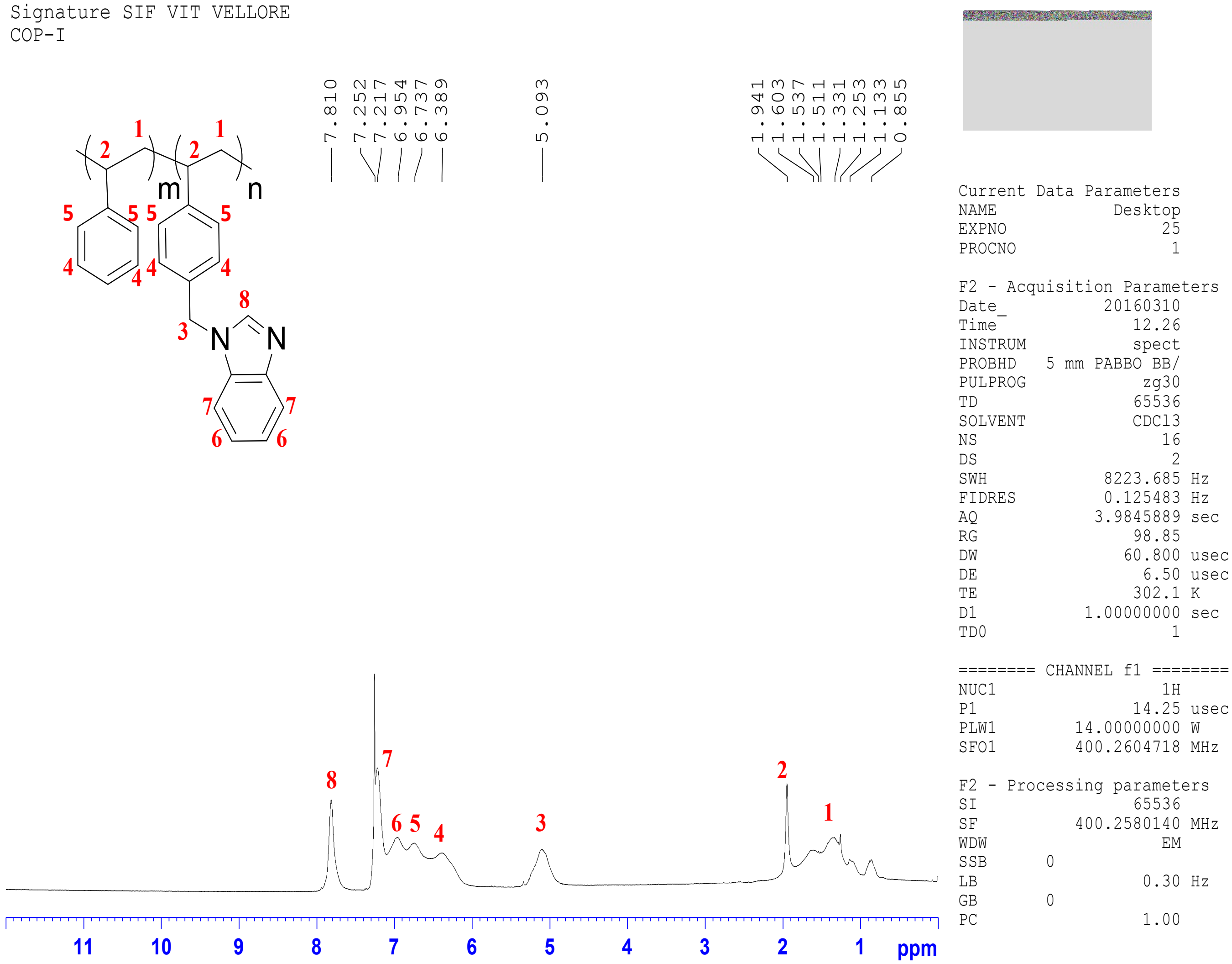

Fig. S5: ^{1}H NMR spectrum of poly(1-(4-Vinylbenyl-1H-benzimidazole-co-styrene) ($CDCl_3$).

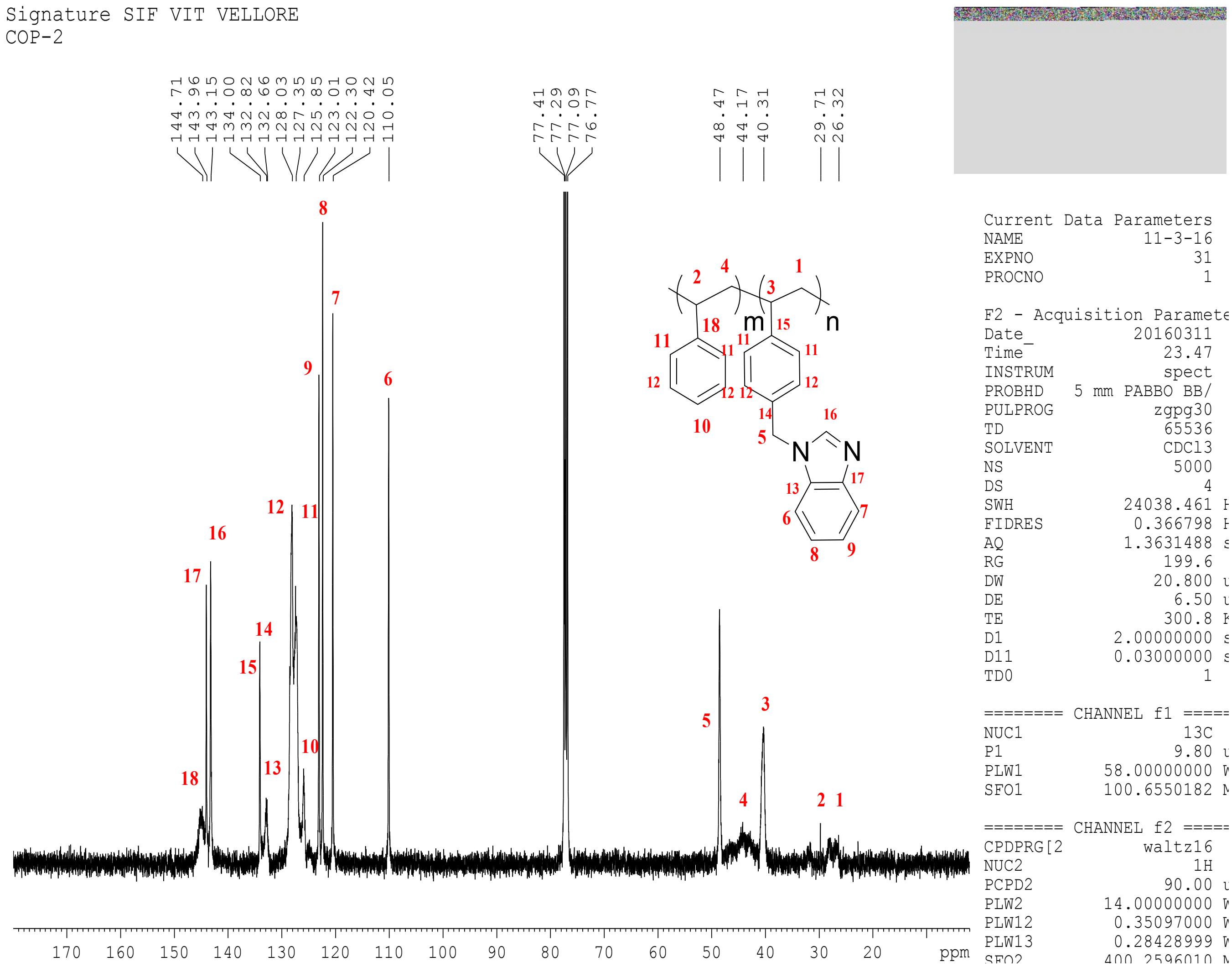

Fig. S6: ^{13}C NMR spectrum of poly(1-(4-Vinylbenyl-1H-benzimidazole-co-styrene) ($CDCl_3$).

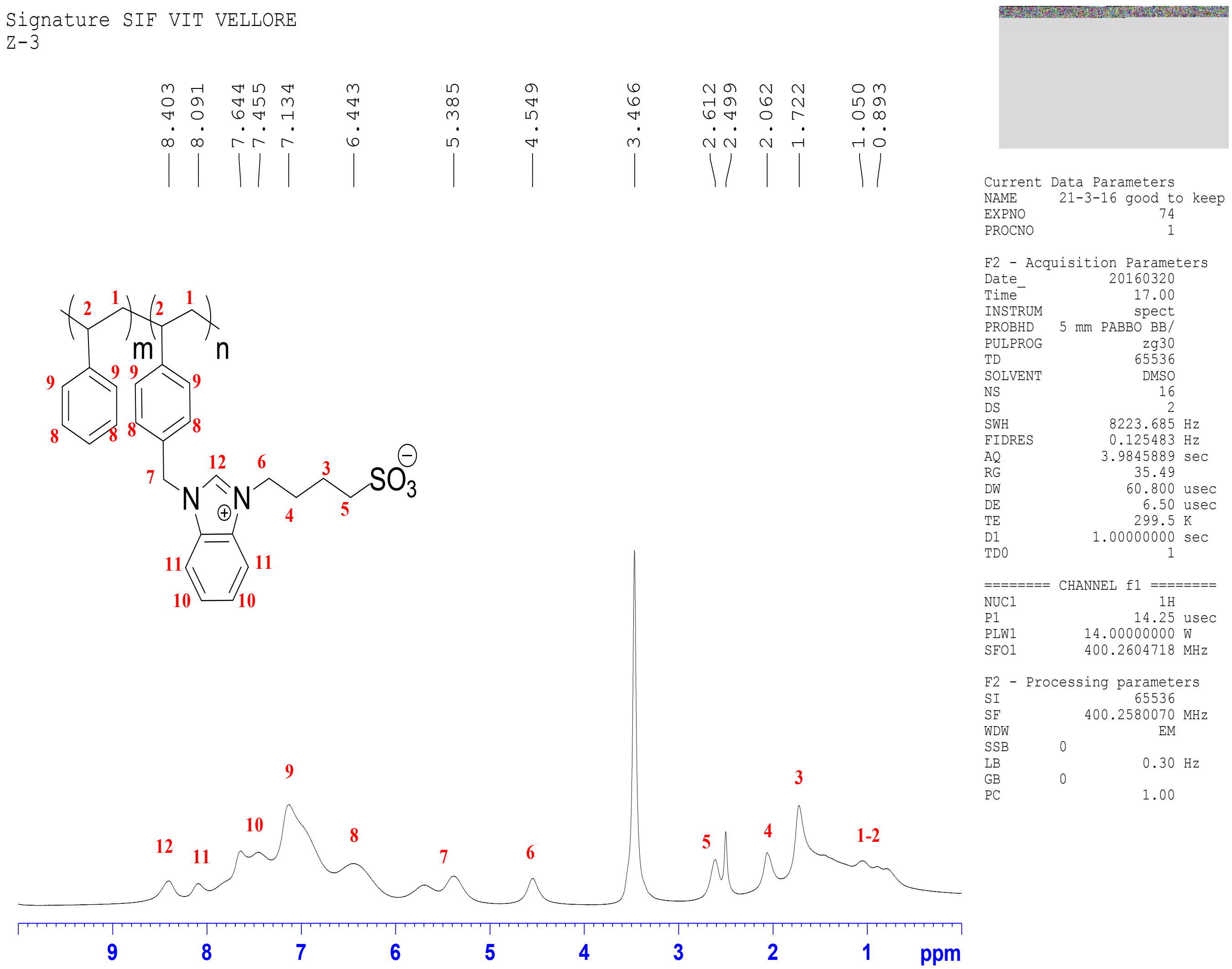

Fig. S7: ^{1}H NMR spectrum of the poly-(4-(1-(4-vinylbenzyl)-1H-benzimidazol-co-styrene-3-ium-3-yl)butane-1-sulphonate (DMSO-d_6).

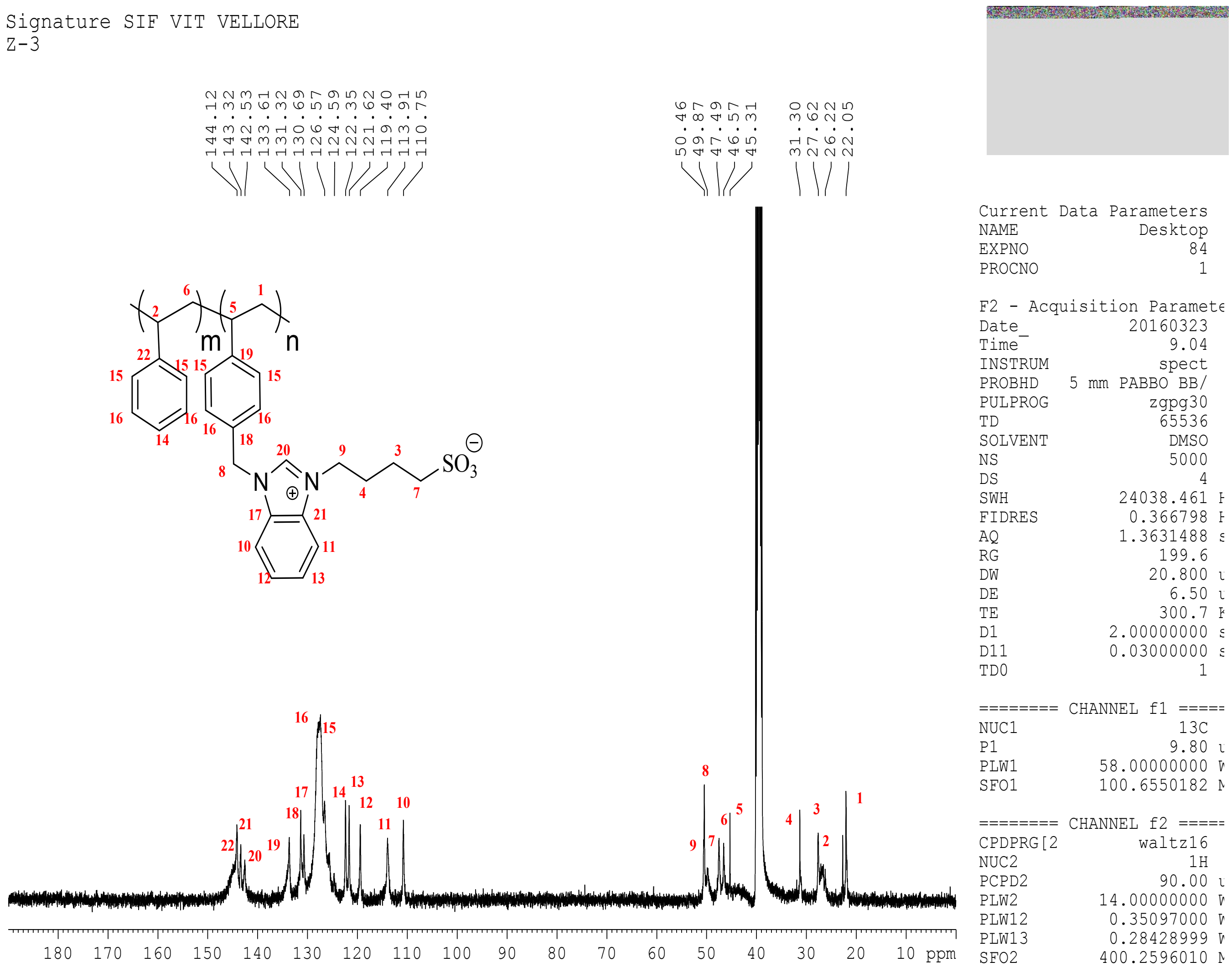

Fig. S8: ^{13}C NMR spectrum of the poly-(4-(1-(4-vinylbenzyl)-1H-benzimidazol-co-styrene-3-ium-3-yl)butane-1-sulphonate (DMSO-d_6).

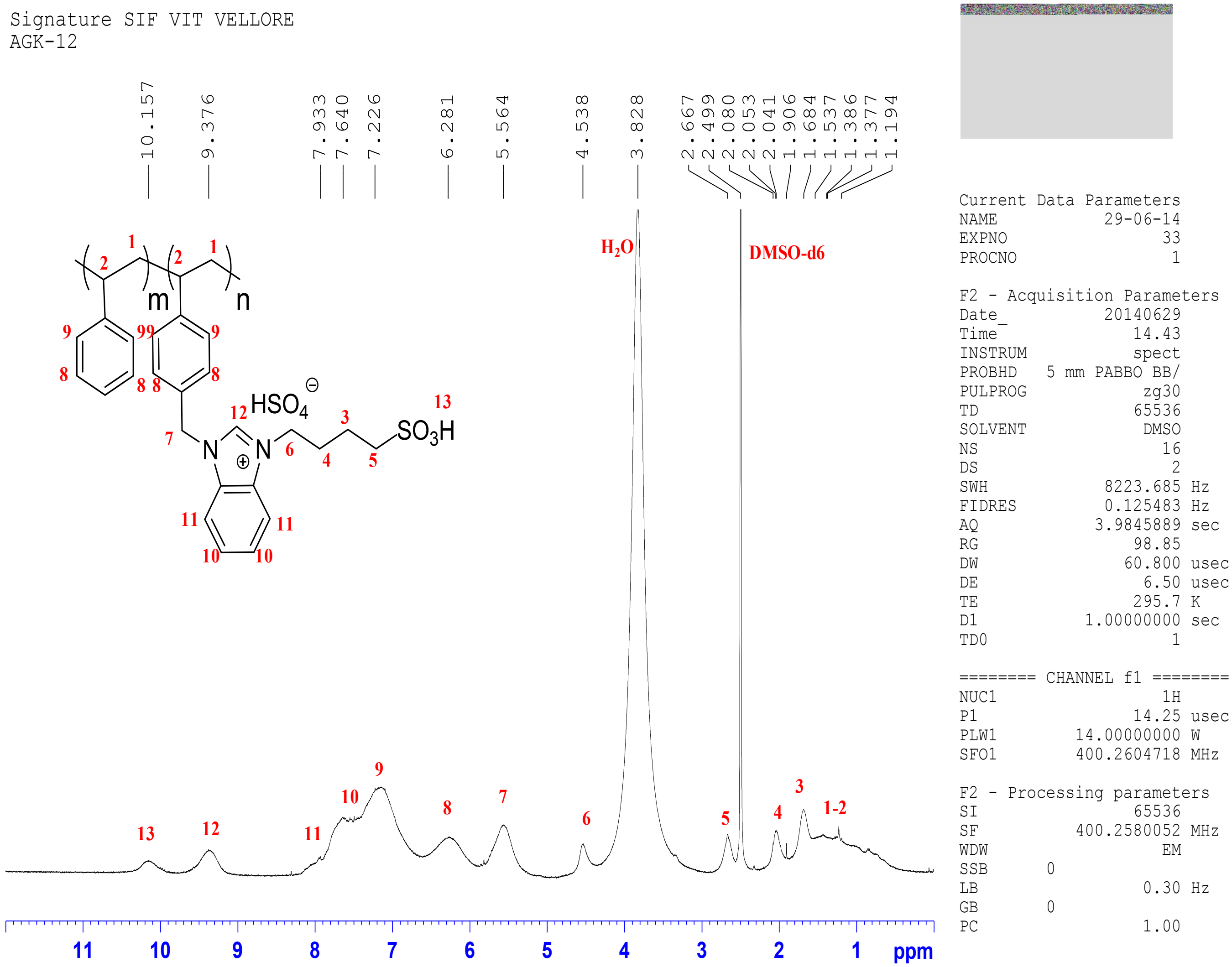

Fig. S9: ^{1}H NMR of the SBPIL (DMSO-d_6).

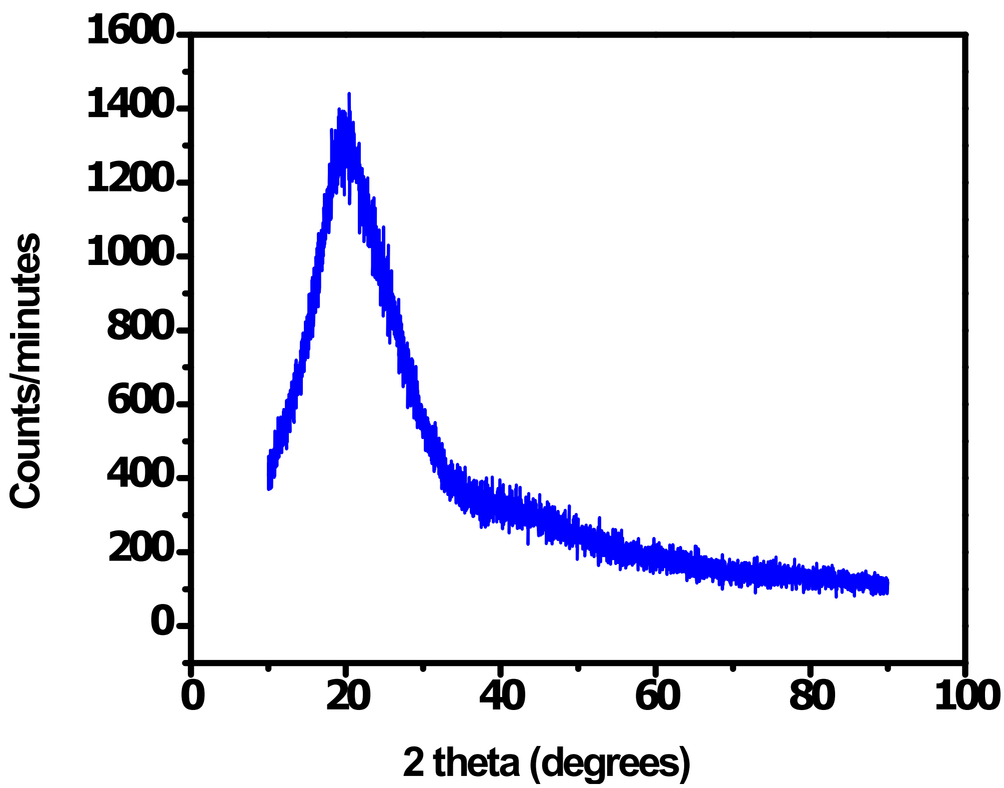

Fig. S10: XRD pattern of SBPIL.

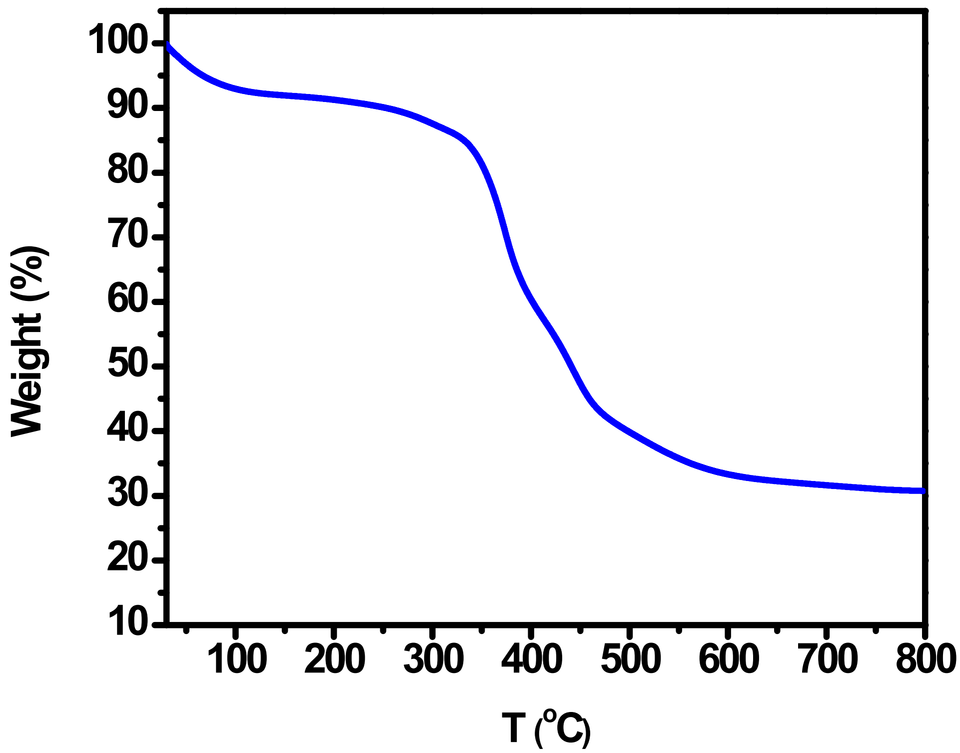

Fig. S11: Thermogravimetric analysis (TGA) of SBPIL.

Thermogravimetric analysis was studied for determining the stability of SBPIL (fig. S11). The TGA curve shows that initial weight loss of 5.44% was observed at 97 °C due to physically adsorbed water while the second major loss of 30.73% starts from 321 °C to 405 °C. This weight loss occurred between 321 °C to 405 °C is due to the alkyl sulphonic groups. The third weight loss of 39.78% was seen from 405 °C to 549 °C which could be due to poly(1-(4-Vinylbenyl-1H-benzimidazole-co-styrene) in SBPIL.

It is clear from this study that SBPIL starts getting decomposed only after 321 °C indicating its thermal stability and thus it can be used for waste water treatment even at higher temperatures.