polymers

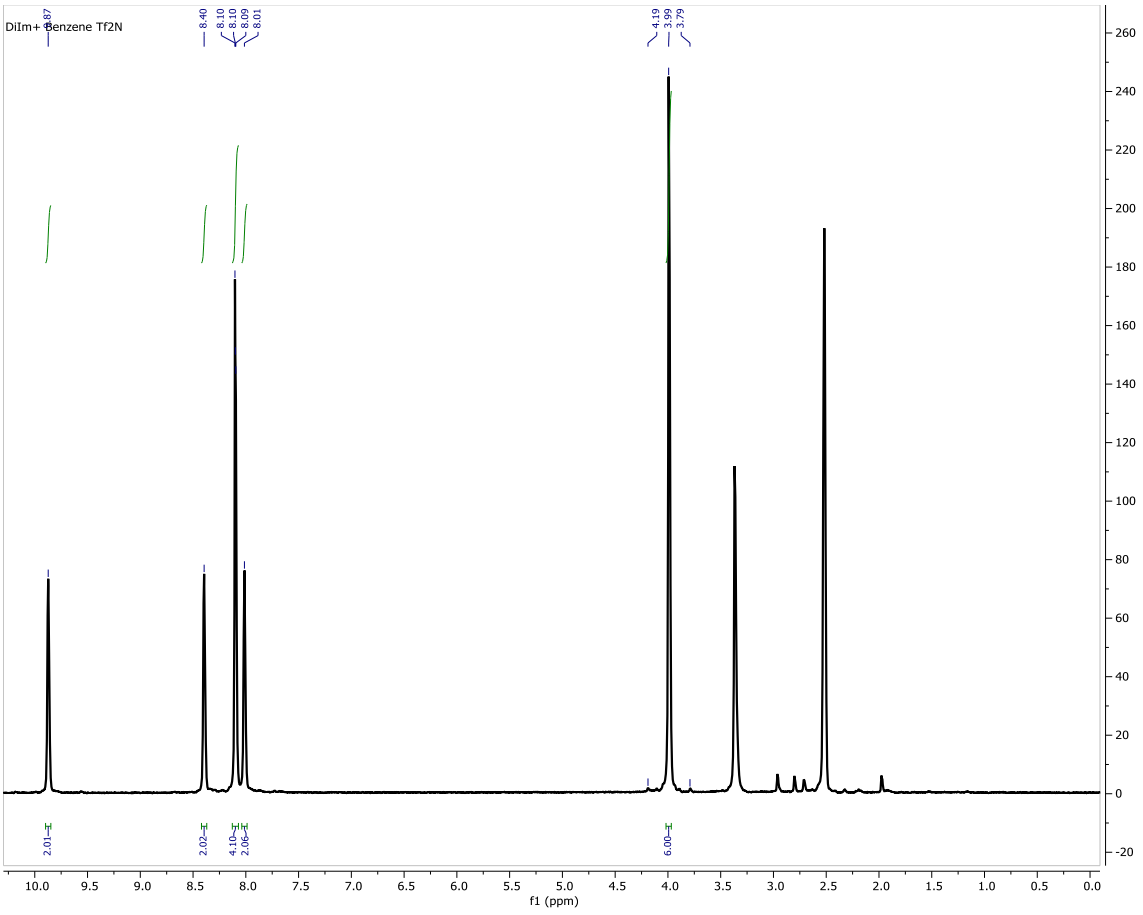
MDPI

SUPPORTING INFORMATION

for

Design and Gas Separation Performance of Imidazolium Poly(ILs) Containing Multivalent Imidazolium Fillers and Crosslinking Agents

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^{1}H-NMR (d6-DMSO) [ppm] δ 9.87 (s, 2H), 8.40 (s, 2H), 8.10 (s, 4H), 8.01 (s, 2H), 3.99 (s, 6H).

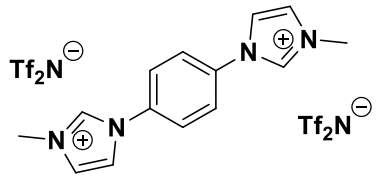
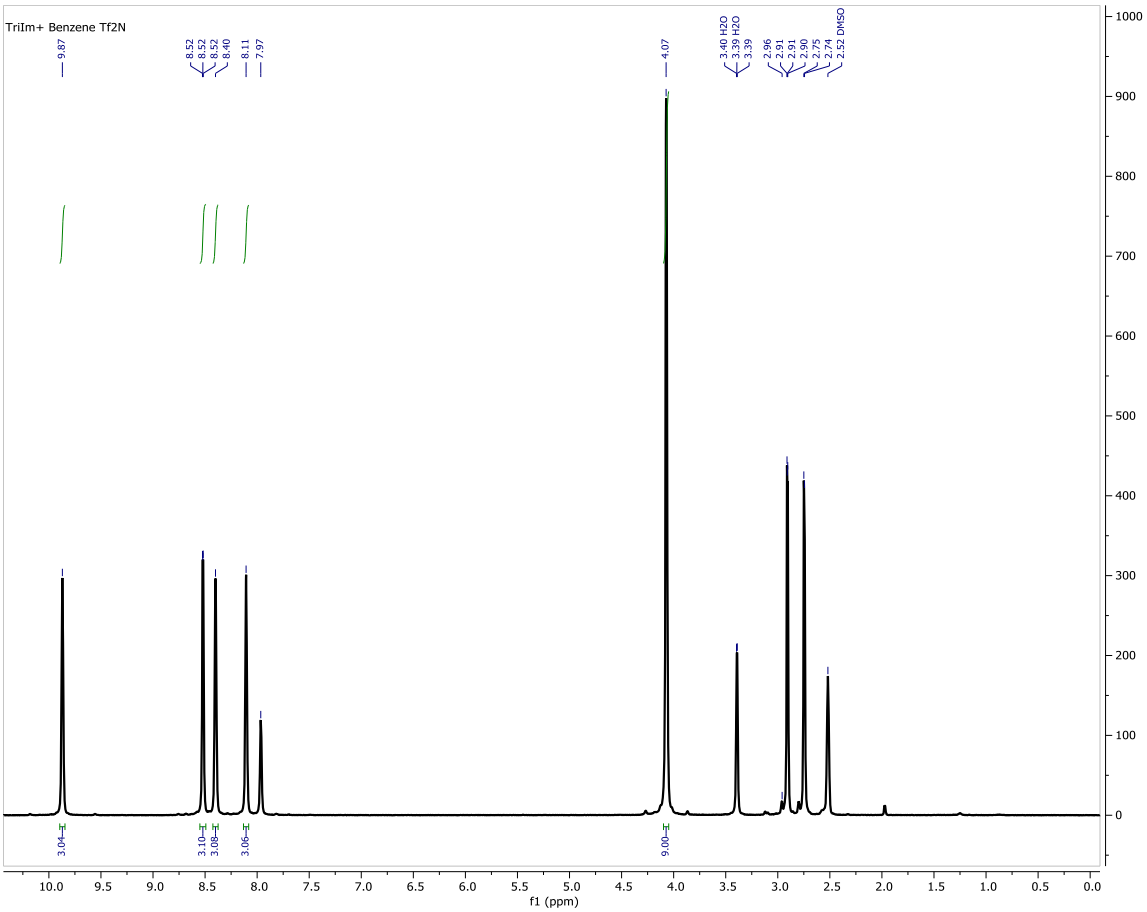


Figure S1: ^{1}H-NMR spectrum for [Di(Im+)Benz)][Tf$_2$N].



^{1}H-NMR (d6-DMSO) [ppm] δ 9.87 (s, 3H), 8.52 (s, 3H), 8.40 (s, 3H), 8.11 (s, 3H), 4.07 (s, 9H).

(some residual DMF was observed)

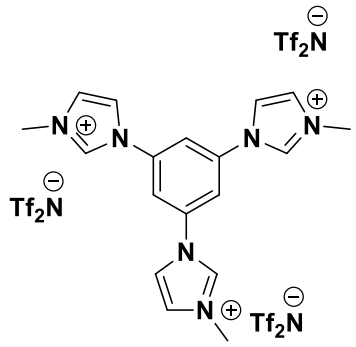
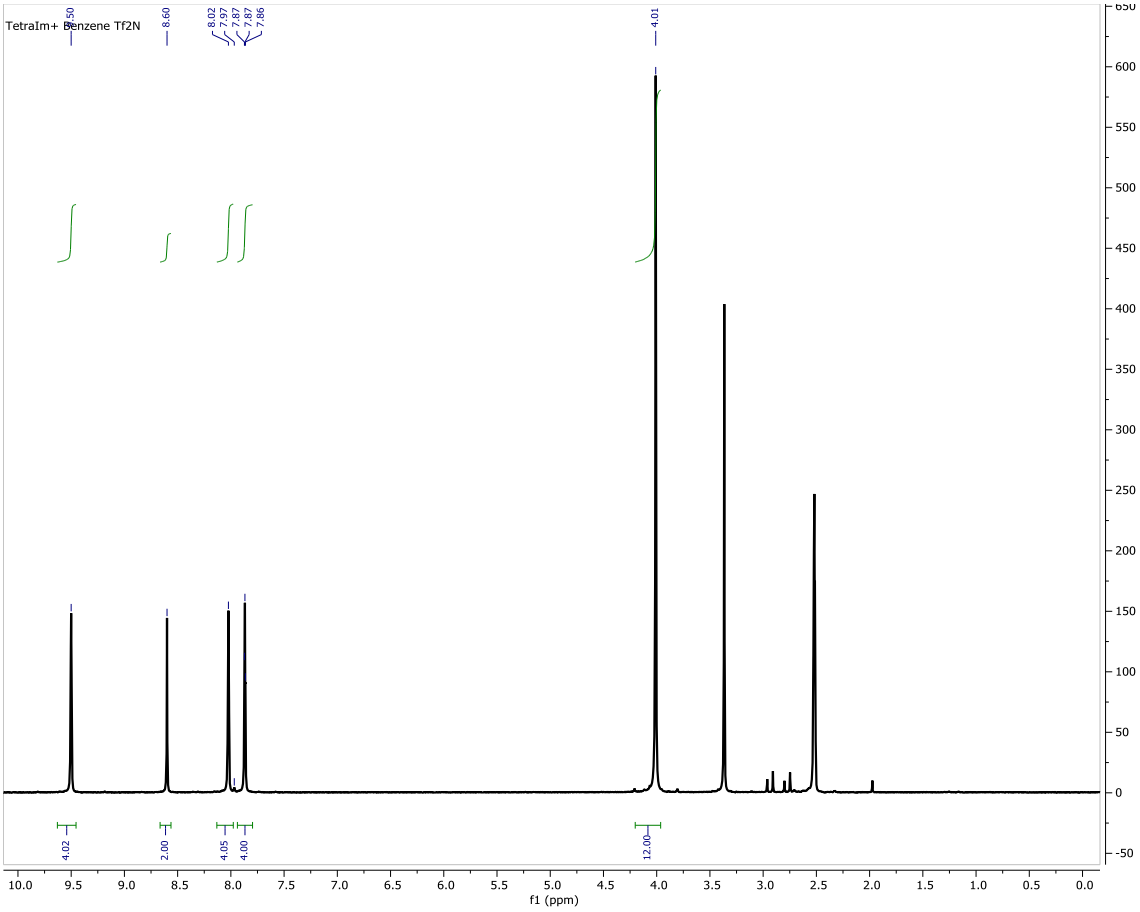


Figure S2: ^{1}H-NMR spectrum for [Tri(Im+)Benz)][Tf$_2$N].



^{1}H-NMR (d6-DMSO) [ppm] δ 9.50 (s, 4H), 8.60 (s, 2H), 8.02 (s, 4H), 7.87 (s, 4H), 4.01 (s, 12H).

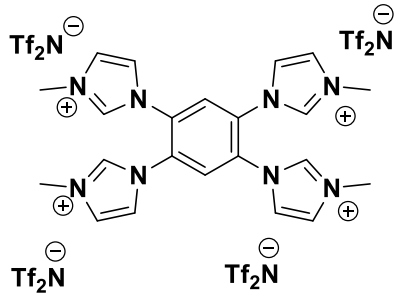
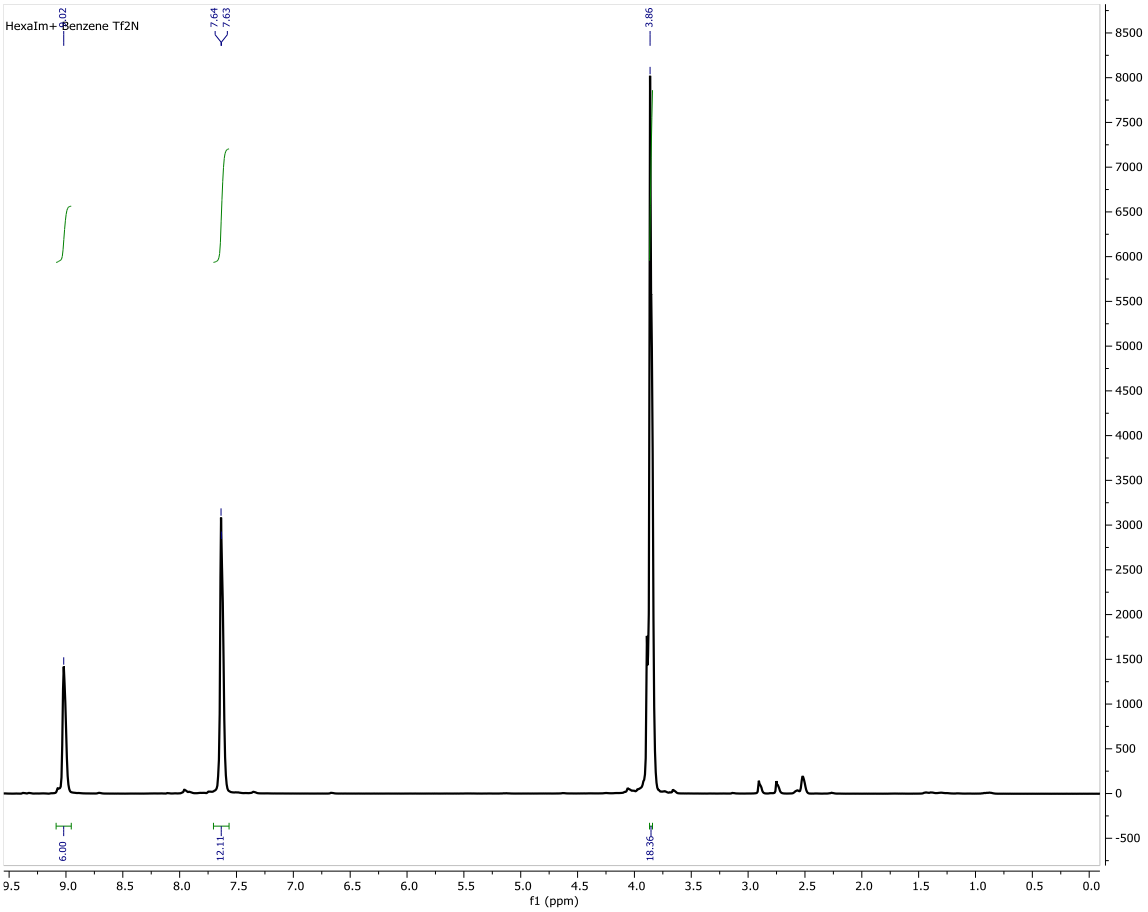


Figure S3: ^{1}H-NMR spectrum for [Tetra(Im+)Benz)][Tf$_2$N].



^{1}H-NMR (d6-DMSO) [ppm] δ 9.02 (s, 6H), 7.64 (s, 12H), 3.86 (s, 18H).

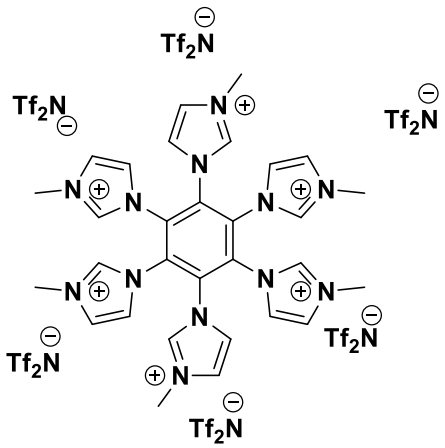
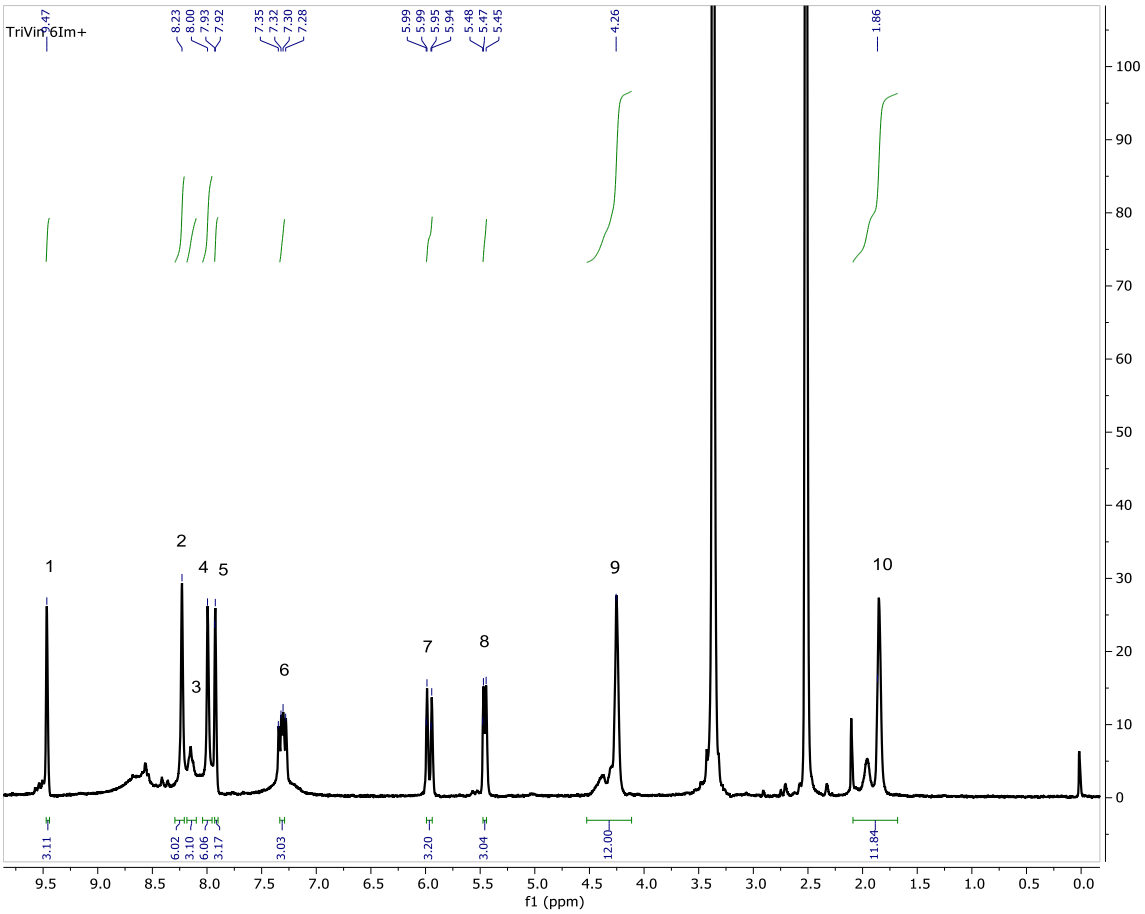
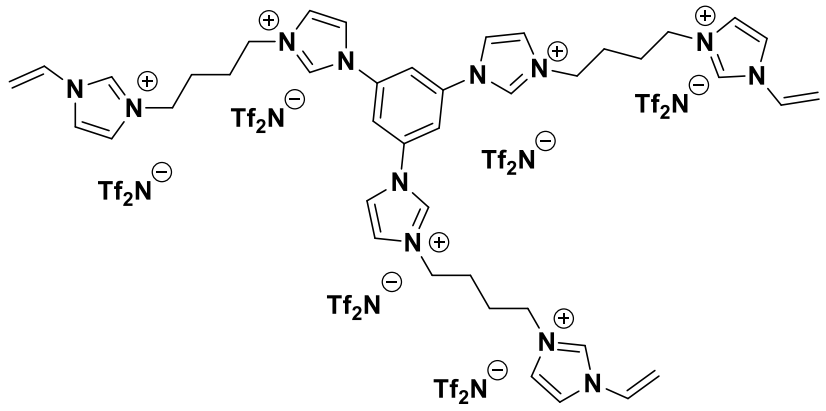


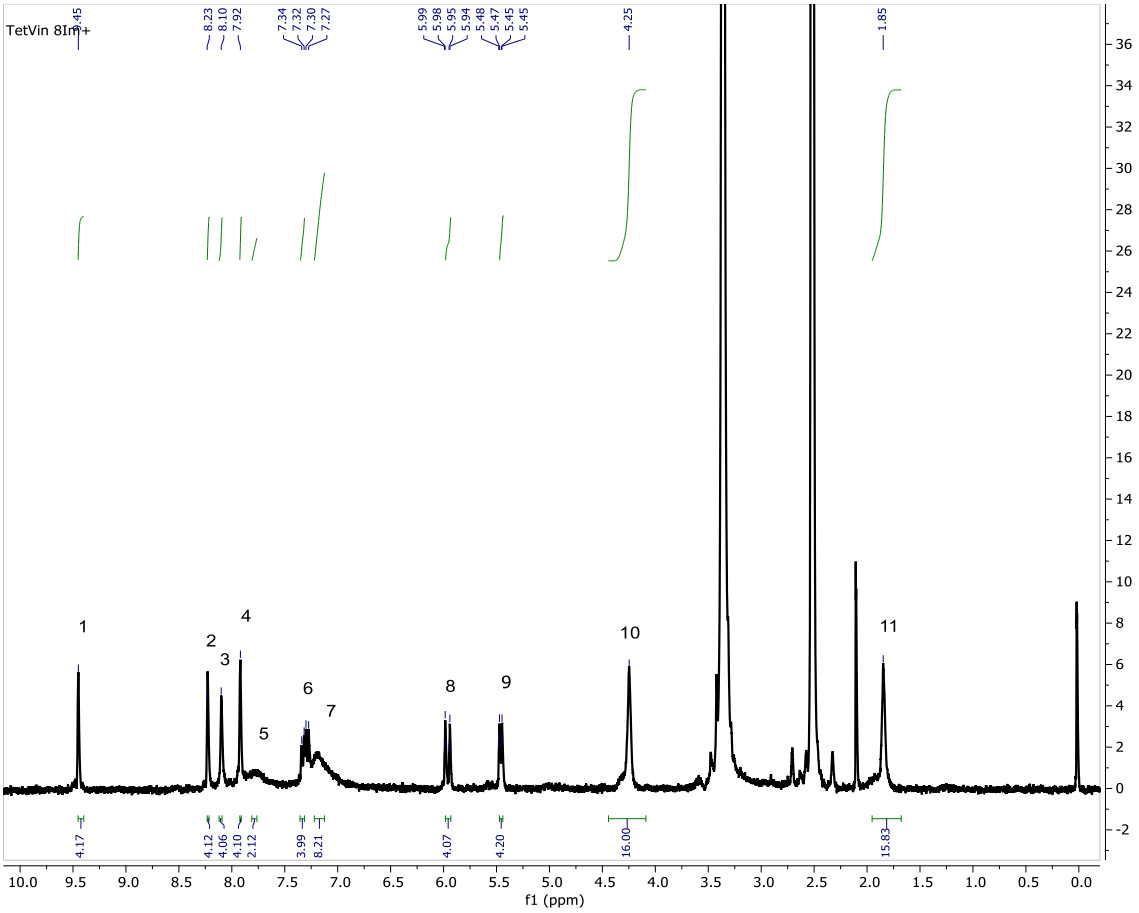
Figure S4: ^{1}H-NMR spectrum for [Hexa(Im+)Benz)][Tf$_2$N].



^{1}H NMR (360 MHz, DMSO) δ 9.47 (s, 3H), 8.23 (s, 6H), 8.15 (s, 3H), 8.00 (s, 6H), 7.93 (d, *J* = 1.6 Hz, 3H), 7.31 (d, *J* = 6.8 Hz, 3H), 5.99 – 5.94 (m, 3H), 5.46 (d, *J* = 9.0 Hz, 3H), 4.26 (s, 12H), 1.86 (s, 12H).

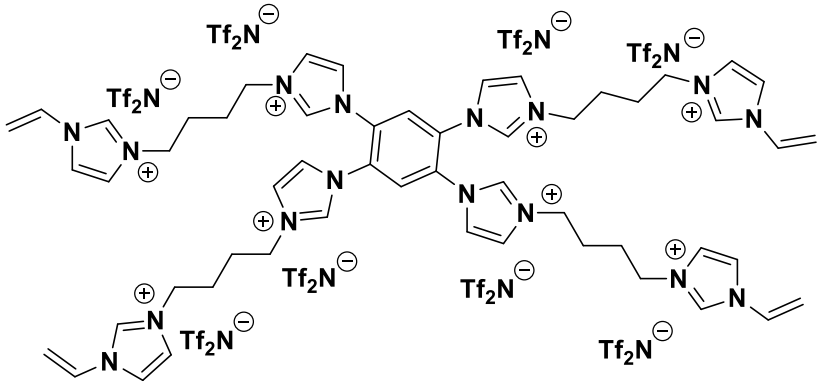
Figure S5: ^{1}H-NMR spectrum for [Tri(VinylIm+)XL)][Tf_2N].





^{1}H NMR (360 MHz, DMSO) δ 9.45 (s, 4H), 8.23 (s, 4H), 8.10 (s, 4H), 7.92 (s, 4H), 7.90 (br, 2H), 7.33 (d, *J* = 8.1 Hz, 4H), 7.27 (br, 8H) 5.99 – 5.93 (m, 4H), 5.46 (dd, *J* = 8.6, 2.3 Hz, 4H), 4.25 (s, 16H), 1.85 (s, 16H).

Figure S6: ^{1}H-NMR spectrum for [Tet(VinylIm+)XL)][Tf_2N].



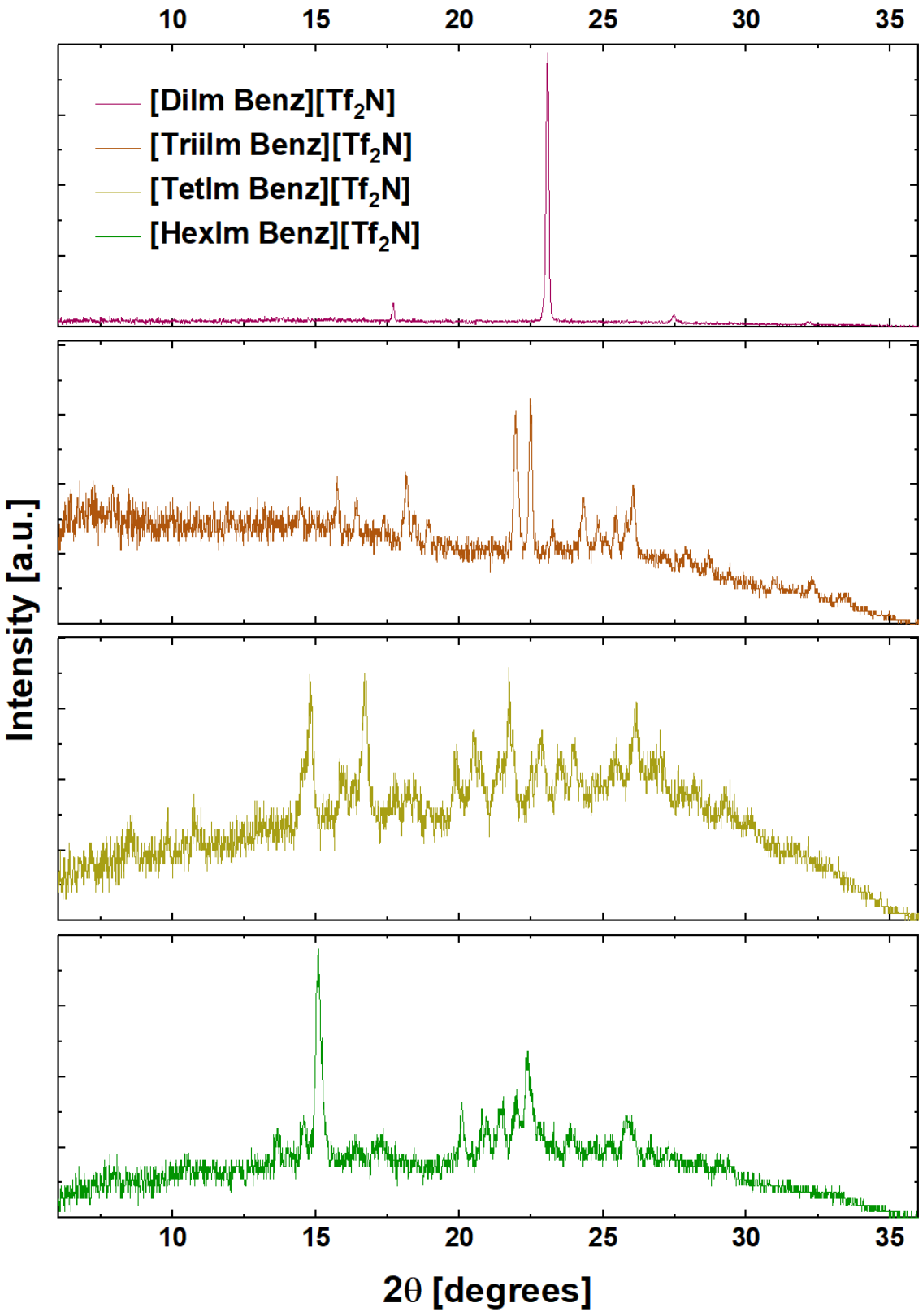


Figure S7: XRD profiles for each recrystallized multivalent filler.