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# Supplementary Information

# Studies on MCM-41/PDMS based hybrid polybenzoxazine nanocomposites for interlayer low k dielectrics

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**FTIR spectral data of**

**OAP-Bz:** (KBr, $cm^{-1}$): 3032 (allylic C-H), 1595 (allylic C=C stretching), 1221 (Ar-O-C), 941 (N-C-O) and 754 (ortho-substituted benzene ring).

**PDMS-Bz:** (KBr, $cm^{-1}$): 2962-2897 (aliphatic CH, $CH_2$ stretching), 1220 (Ar-O-C), 1081-1023 (Si-O-C), 943 (N-C-O).

**TES-Bz:** (KBr, $cm^{-1}$): 2945-2837 (aliphatic CH, $CH_2$ stretching), 1242 (Ar-O-C), 1100-1027 (Si-O-C), 930 (N-C-O).

**BTMS:** (KBr, $cm^{-1}$): 2935 (aliphatic CH, $CH_2$ stretching), 1223 (Ar-O-C), 1188-1081 (Si-O-C), 941 (N-C-O).

**NMR spectral data of**

**OAP-Bz:**

**$^1$H NMR (400MHz, $CDCl_3$) δ (ppm):** 7.28-6.82 (8H, Ar), 6.00-5.93 (1H, =C<u>H</u>), 5.37 (2H, O-C<u>H$_2$</u>-N), 5.04-5.00 (2H, =C<u>H$_2$</u>), 4.62 (2H, Ar-C<u>H$_2$</u>-N) and 3.34-3.32 (2H, CH=CH$_2$-C<u>H$_2$</u>).

**PDMS-Bz:**

**$^1$H NMR (400MHz, $CDCl_3$) δ (ppm):** 7.41-6.79 (16H, Ar), 5.34 (4H, O-C<u>H$_2$</u>-N), 4.61 (4H, Ar-C<u>H$_2$</u>-N), 2.59-2.55 (4H, Ar-C<u>H$_2$</u>), 1.61-1.57 (4H, Ar-CH$_2$-C<u>H$_2$</u>), 0.61-0.57 (4H, C<u>H$_2$</u>-Si) and 0.08-0.04 (54H, C<u>H$_3$</u>-Si-C<u>H$_3$</u>).

**$^{13}$C NMR (400 MHz, CDCl3) δ (ppm):** 148.5-118.1 (aromatic carbons), 79.04 (O-$\underline{C}H_2$-Ar), 50.76 (N-$\underline{C}H_2$-Ar), 33.38-18.27 (aliphatic carbons) and 1.17-1.06 ($\underline{C}H_3$-Si-$\underline{C}H_3$).

**TES-Bz:**

**$^{1}$H NMR (400 MHz, CDCl3) δ (ppm):** 7.2-6.75 (4H, Ar), 4.84 (2H, O-C$\underline{H}_2$-N), 3.97 (2H, Ar-C$\underline{H}_2$-N), 3.82–3.80 (6H, O–C$\underline{H}_2$–$CH_3$), 2.76–2.73 (2H, N–C$\underline{H}_2$), 1.59 (2H, N–$CH_2$–C$\underline{H}_2$), 1.23-1.20 (9H,O–$CH_2$–C$\underline{H}_3$), 0.67–0.60 (2H,Si–C$\underline{H}_2$).

**$^{13}$C NMR (400 MHz, CDCl3) δ (ppm):** 156.7-115.54 (aromatic carbons), 82.44 (O-$\underline{C}H_2$-N), 58.41 (O-$\underline{C}H_2$-$CH_3$), 55.68 (N-$\underline{C}H_2$-Ar), 54.12 (N–$\underline{C}H_2$), 21.39 (N–$CH_2$–$\underline{C}H_2$), 18.27 (O–$CH_2$–$\underline{C}H_3$), 7.74 (Si–$\underline{C}H_2$).

**$^{29}$Si NMR (400 MHz, CDCl3) δ (ppm):** -51.82 ($\underline{Si}$-O-$CH_2$-$CH_3$).

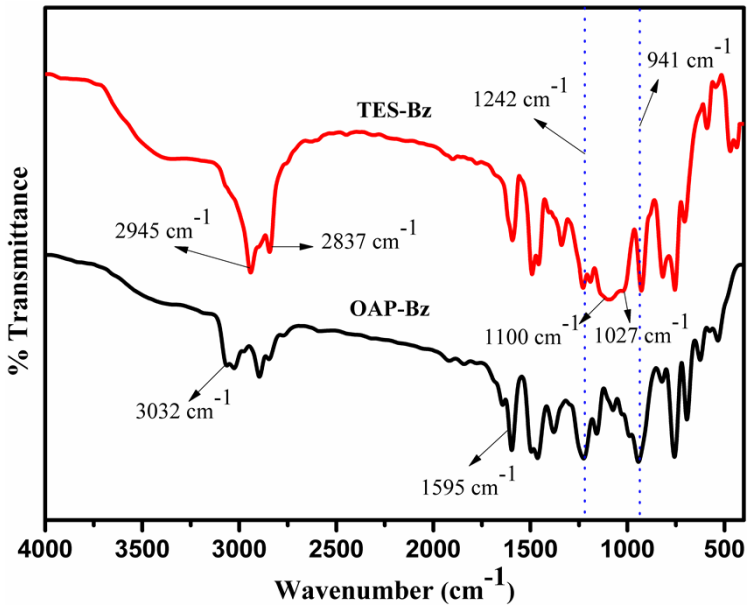


**Figure S1.** FTIR spectra of OAP-Bz and TES-Bz.

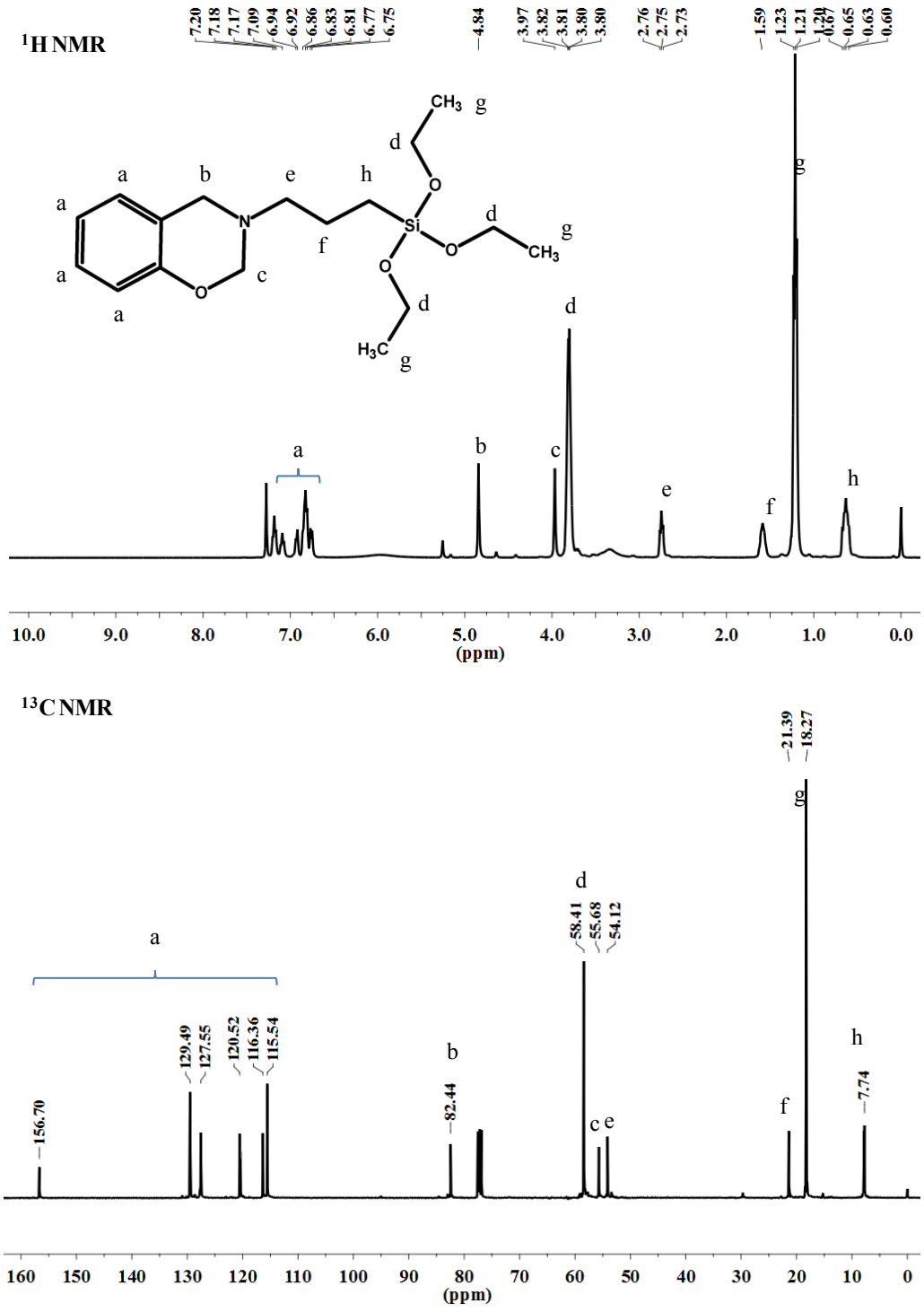


**Figure S2.** $^{1}$H and $^{13}$C NMR spectra of TES-Bz.

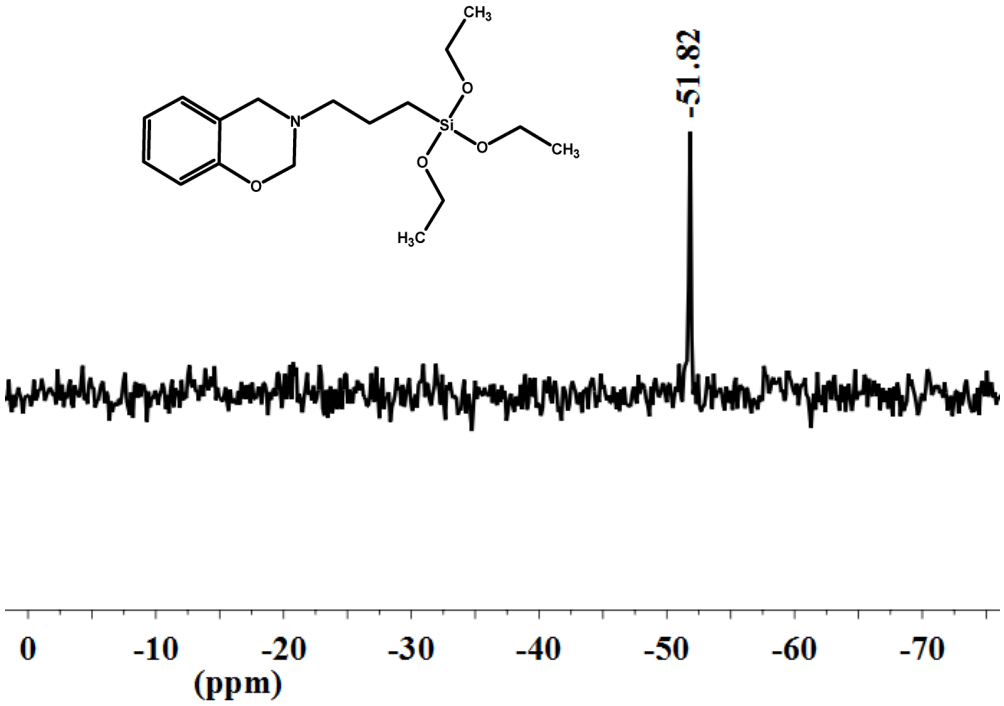


**Figure S3.** $^{29}$Si NMR spectrum of TES-Bz.