Supporting Information

The role of molecular structure on impact resistance and bending strength of photocured urethane-dimethacrylate polymer networks

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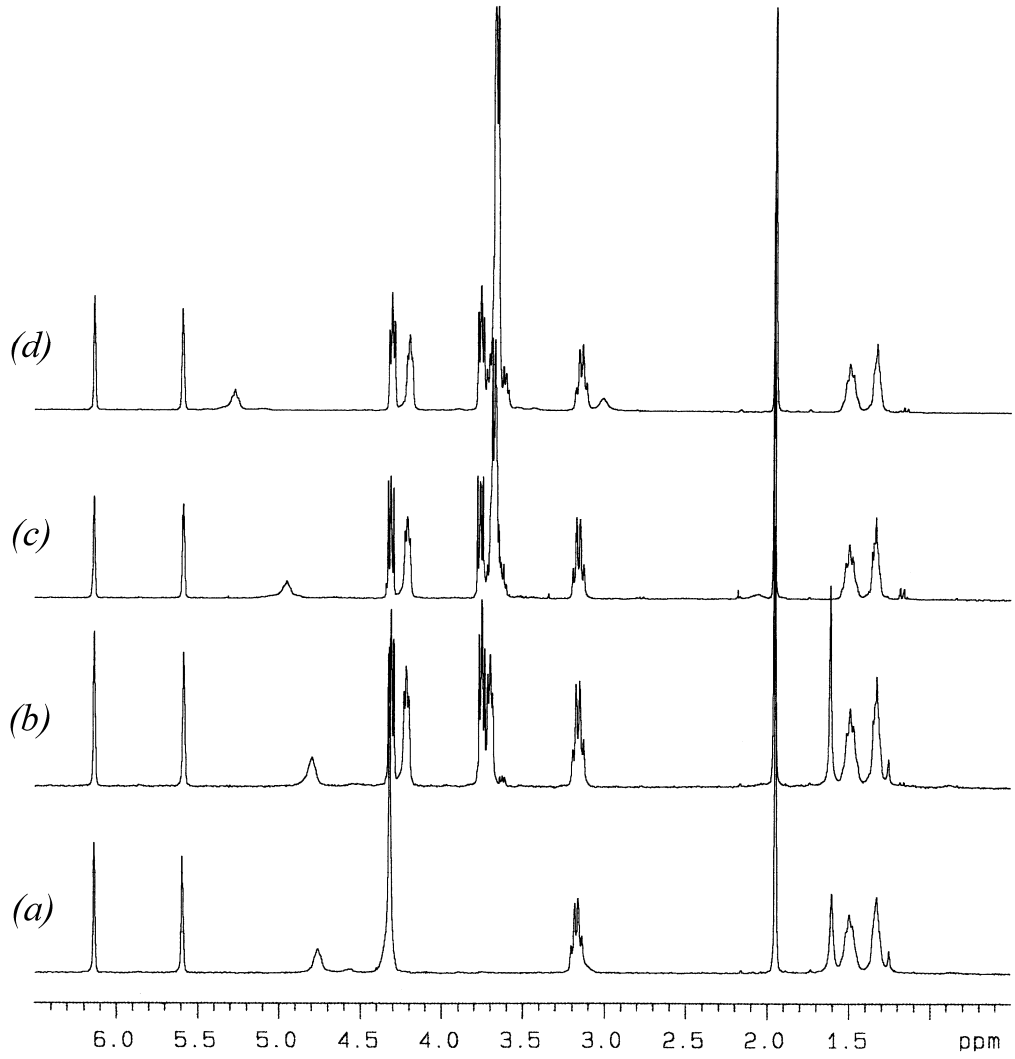
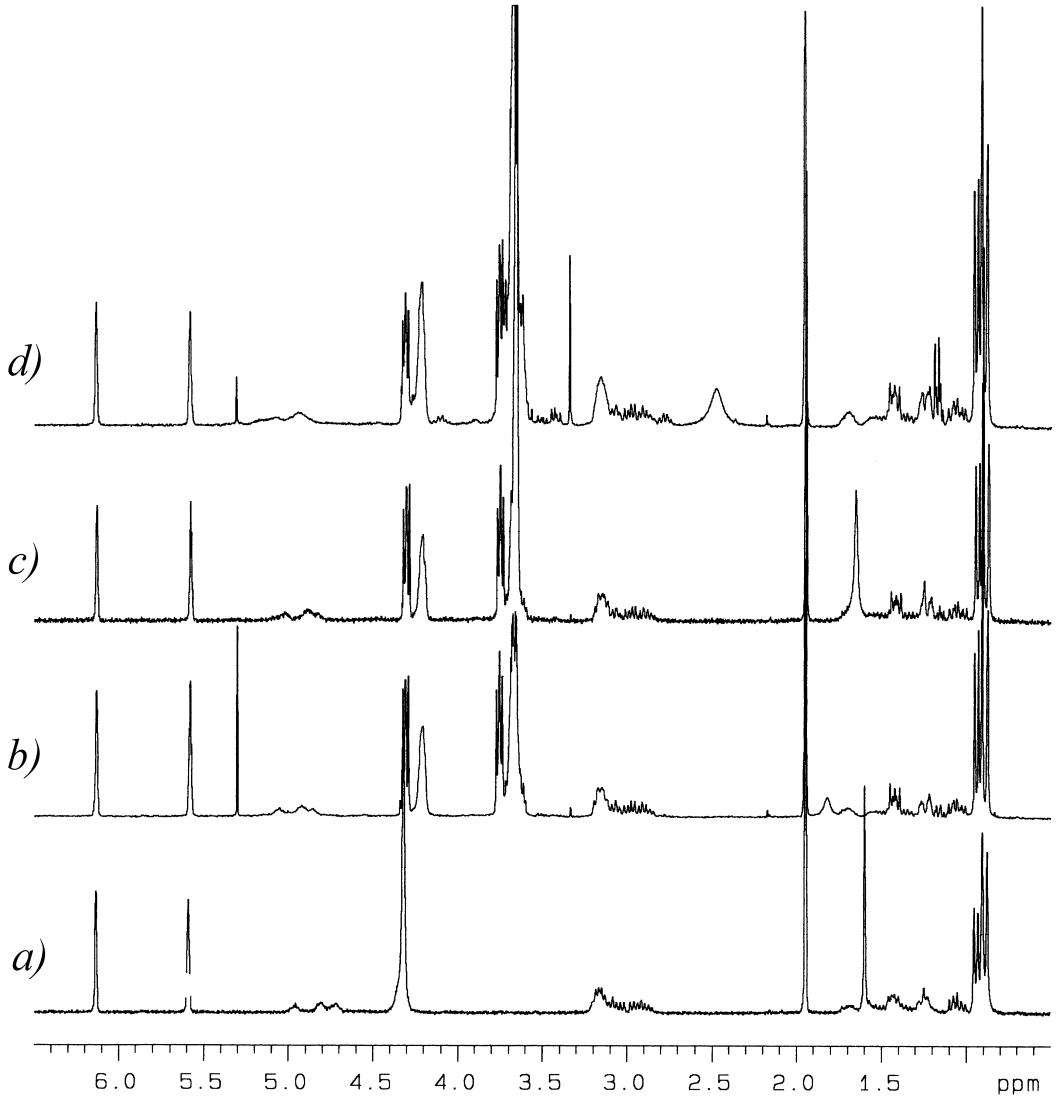
Figure S1. The 1H NMR spectra of the OEGMMA/HMDI series: *(a) HEMA/HMDI, (b) DEGMMA/HMDI, (c) TEGMMA/HMDI, (d) TTEGMMA/HMDI.*



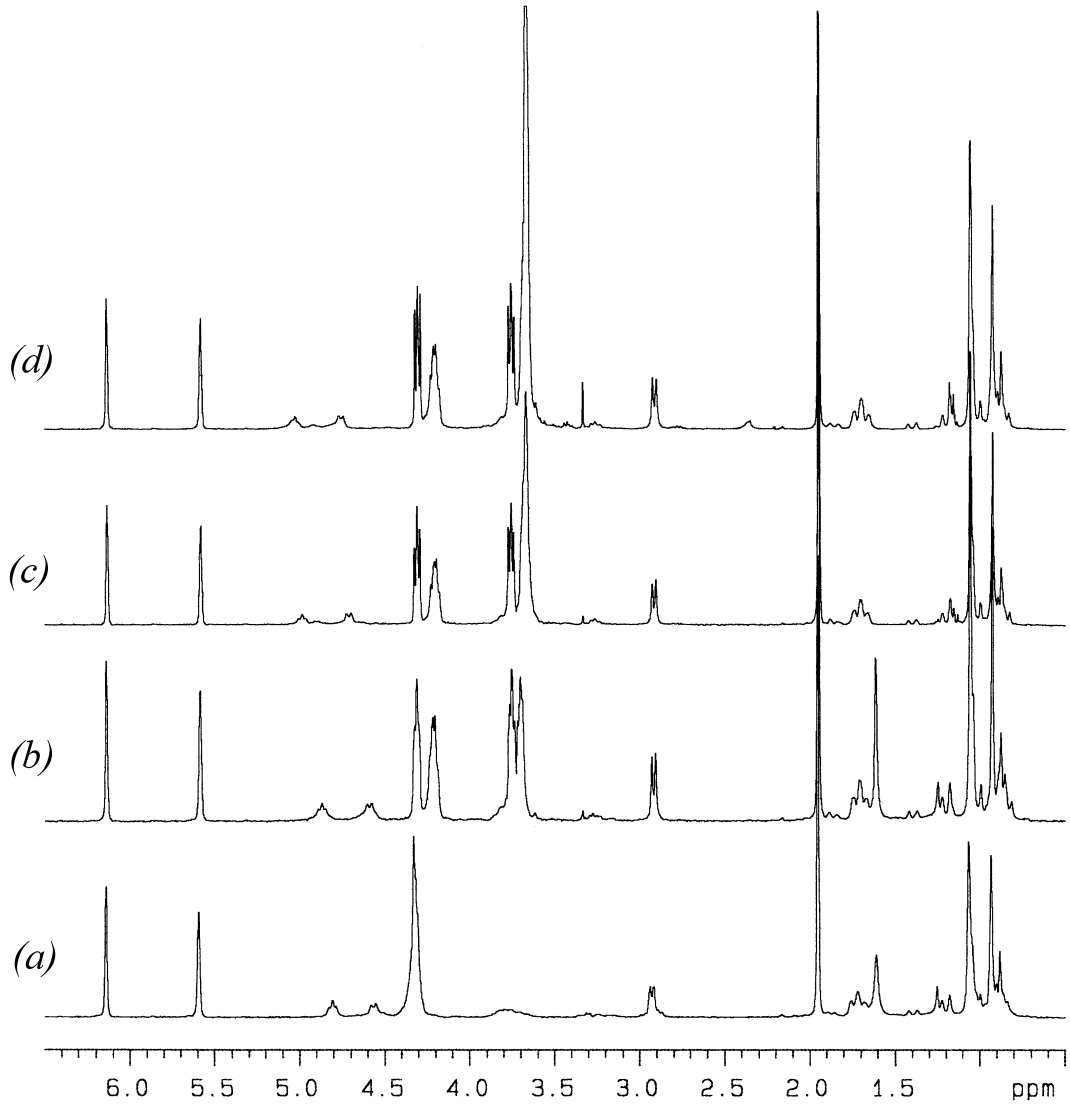
δ=1.32 ppm and δ=1.49 ppm (2m, 8H, $-CH_2-$), δ=1.95 ppm (s, 6H, CH_3-C), δ=3.15 ppm (q, 4H, $-OCONHC\underline{H}_2-$),
(a) δ=4.32 ppm (s, 8H, $-OCH_2CH_2O-$),
(b) δ=3.70 and 3.77 ppm (2m, 8H, $-CH_2O-$), δ=4.21 ppm (m, 4H, $-C\underline{H}_2OCONH-$), δ=4.31 ppm (m, 4H, $-CH_2OCO-$),
(c) δ=3.70 and 3.77 ppm (1s, 8H and 2m, 8H, $-CH_2O-$), δ=4.21 ppm (m, 4H, $-C\underline{H}_2OCONH-$), δ=4.31 ppm (m, 4H, $-CH_2OCO-$),
(d) δ=3.70 and 3.77 ppm (1s, 16H and 2m, 8H, $-CH_2O-$), δ=4.21 ppm (m, 4H, $-C\underline{H}_2OCONH-$), δ=4.31 ppm (m, 4H, $-CH_2OCO-$),
δ=4.85-5.25 ppm (t, 2H, −NHCOO−), δ=5.59 and δ=6.14 (2s, 4H, $CH_2=$).

Figure S2. The 1H NMR spectra of the OEGMMA/TMDI series: *(a) HEMA/TMDI, (b) DEGMMA/TMDI, (c) TEGMMA/TMDI, (d) TTEGMMA/TMDI.*



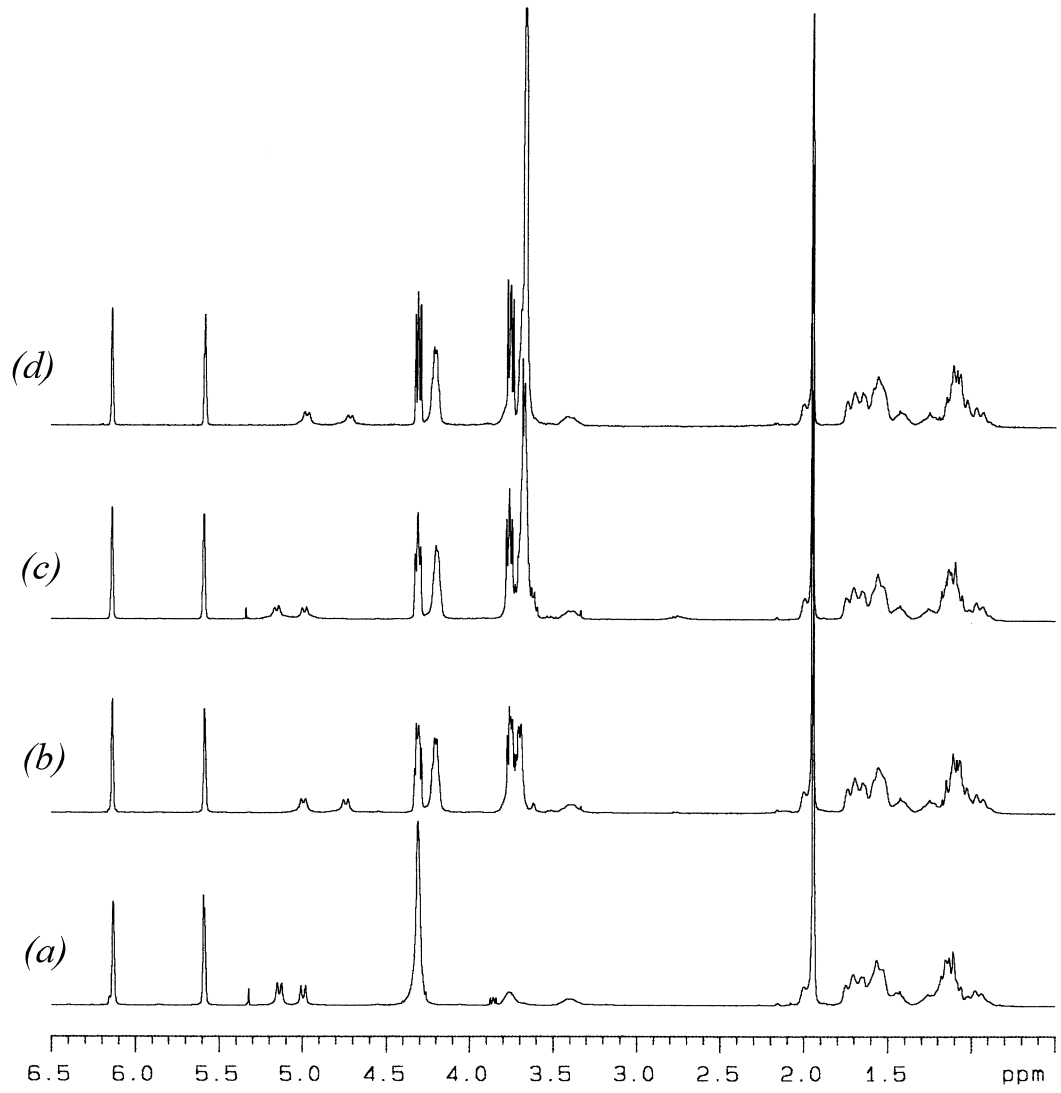
δ=0.91 ppm (q, 9H, –CH_3–), δ=0.98-1.80 ppm (m, 5H, –CH_2–, –CH<), δ=1.95 ppm (s, 6H, CH_3–), δ=2.70-3.22 ppm (q, 4H, –OCONHC$\underline{H}_2$–),
(a) δ=4.32 ppm (s, 8H, –OCH_2CH_2O–),
(b) δ=3.70 and 3.77 ppm (2m, 8H, –CH_2O–), δ=4.21 ppm (m, 4H, –C$\underline{H}_2$OCONH–), δ=4.31 ppm (m, 4H, –CH_2OCO–),
(c) δ=3.70 and 3.77 ppm (1s, 8H and 2m, 8H, –CH_2O–), δ=4.21 ppm (m, 4H, –C$\underline{H}_2$OCONH–), δ=4.31 ppm (m, 4H, –CH_2OCO–),
(d) δ=3.70 and 3.77 ppm (1s, 16H and 2m, 8H, –CH_2O–), δ=4.21 ppm (m, 4H, –C$\underline{H}_2$OCONH–), δ=4.31 ppm (m, 4H, –CH_2OCO–),
δ=4.71 and 4.95 ppm (2t, 2H, –NHCOO–), δ=5.59 and δ=6.14 (2s, 4H, CH_2=).

Figure S3. The 1H NMR spectra of the OEGMMA/IPDI series: *(a) HEMA/*IPDI*, (b) DEGMMA/IPDI, (c) TEGMMA/IPDI, (d) TTEGMMA/IPDI.*



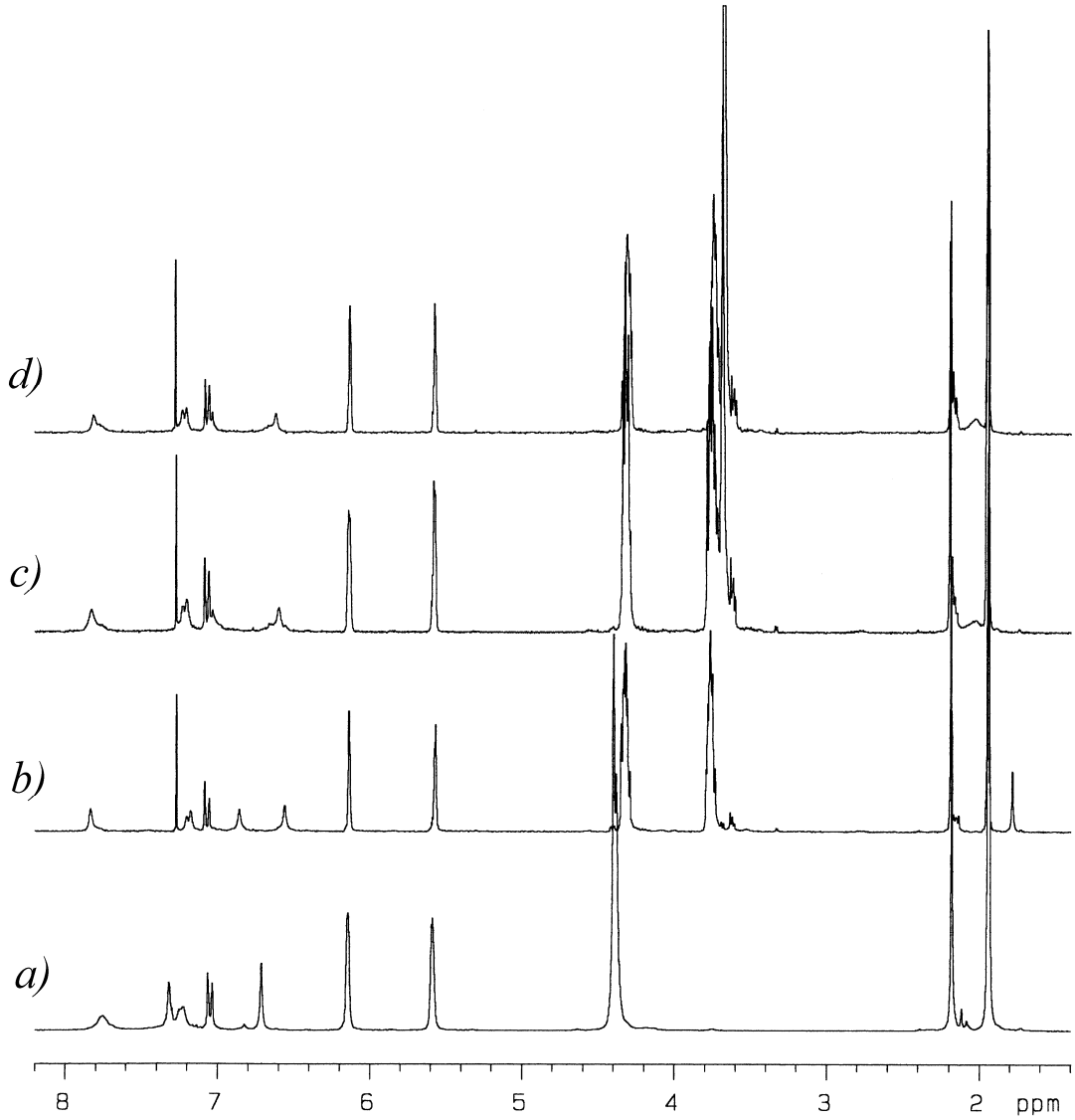
δ=0.8-1.9 ppm (m, 15H, $-CH_2-$, $-CH_3$), δ=1.95 ppm (s, 6H, CH_3-), δ=2.9-3.9 ppm (m, 3H, $-HNC\underline{H}_2-$, $-HNC\underline{H}<$),
(a) δ=4.32 ppm (s, 8H, $-OCH_2CH_2O-$),
(b) δ=3.70 and 3.77 ppm (2m, 8H, $-CH_2O-$), δ=4.21 ppm (m, 4H, $-C\underline{H}_2OCONH-$), δ=4.31 ppm (m, 4H, $-CH_2OCO-$),
(c) δ=3.70 and 3.77 ppm (1s, 8H and 2m, 8H, $-CH_2O-$), δ=4.21 ppm (m, 4H, $-C\underline{H}_2OCONH-$), δ=4.31 ppm (m, 4H, $-CH_2OCO-$),
(d) δ=3.70 and 3.77 ppm (1s, 16H and 2m, 8H, $-CH_2O-$), δ=4.21 ppm (m, 4H, $-C\underline{H}_2OCONH-$), δ=4.31 ppm (m, 4H, $-CH_2OCO-$),
δ=4.60 and 4.90 ppm (t, d, 2H, –NHCOO–), δ=5.59 and δ=6.14 (2s, 4H, $CH_2=$).

Figure S4. The 1H NMR spectra of the OEGMMA/CHMDI series: (a) HEMA/CHMDI, (b) DEGMMA/CHMDI, (c) TEGMMA/CHMDI, (d) TTEGMMA/CHMDI.



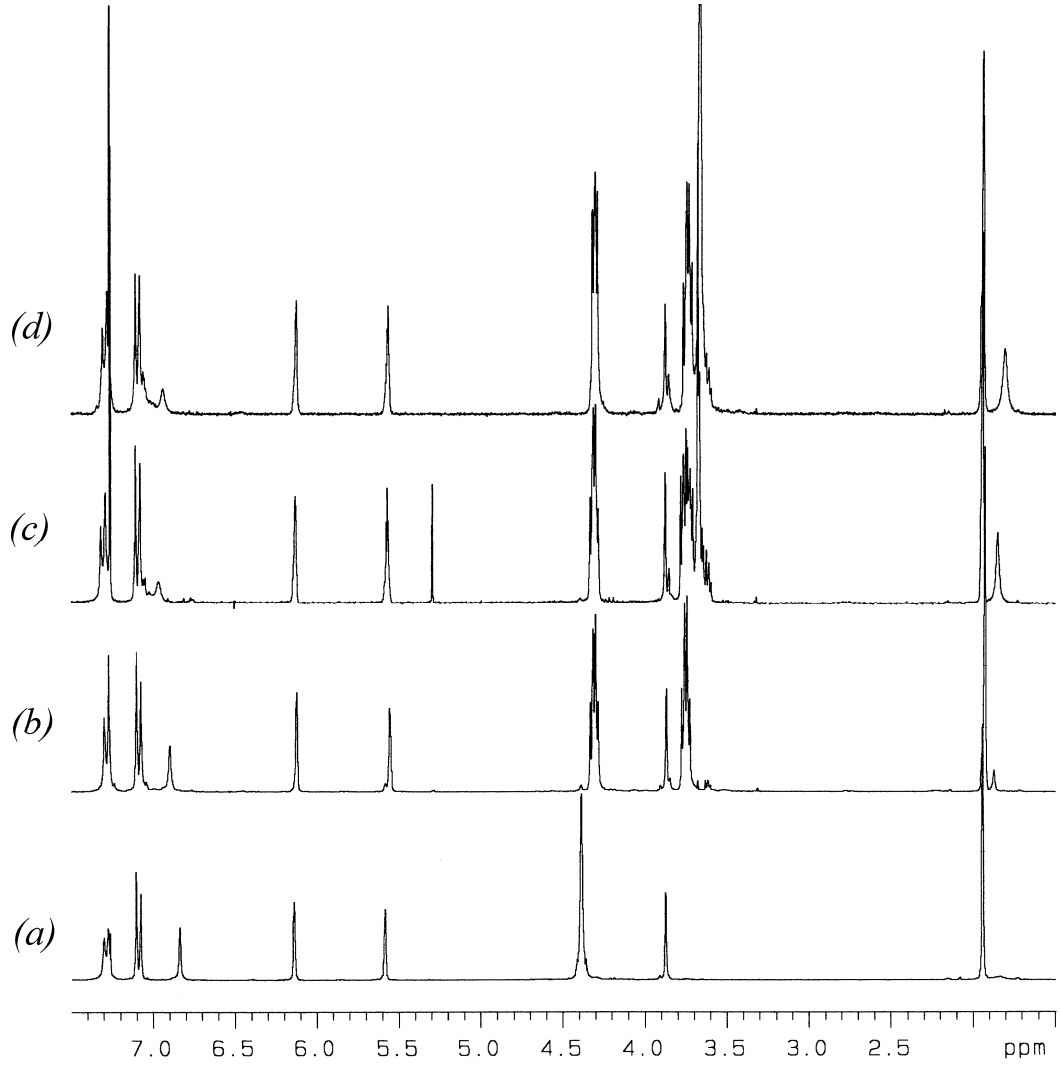
δ=0.8-2.1 ppm (m, 20H, $-CH_2-$, >CH–), δ=1.95 ppm (s, 6H, CH_3-), δ=3.4 ppm and δ=3.78 ppm (m, t, 2H, >C<u>H</u>–NH–),
(a) δ=4.32 ppm (s, 8H, $-OCH_2CH_2O-$),
(b) δ=3.70 and 3.77 ppm (2m, 8H, $-CH_2O-$), δ=4.21 ppm (m, 4H, $-C\underline{H}_2OCONH-$), δ=4.31 ppm (m, 4H, $-CH_2OCO-$),
(c) δ=3.70 and 3.77 ppm (1s, 8H and 2m, 8H, $-CH_2O-$), δ=4.21 ppm (m, 4H, $-C\underline{H}_2OCONH-$), δ=4.31 ppm (m, 4H, $-CH_2OCO-$),
(d) δ=3.70 and 3.77 ppm (1s, 16H and 2m, 8H, $-CH_2O-$), δ=4.21 ppm (m, 4H, $-C\underline{H}_2OCONH-$), δ=4.31 ppm (m, 4H, $-CH_2OCO-$),
δ=4.96 and 5.15 ppm (2d, 2H, –NHCOO–), δ=5.59 and δ=6.14 (2s, 4H, $CH_2=$).

Figure S5. The 1H NMR spectra of the OEGMMA/TDI series: (a) HEMA/TDI, (b) DEGMMA/TDI, (c) TEGMMA/TDI, (d) TTEGMMA/TDI.



δ=1.95 ppm (s, 6H, CH_3–), δ=2.20 ppm (s, 3H, CH_3–Ar),
(a) δ=4.4 ppm (s, 8H, –OCH_2CH_2O–),
(b) δ=3.70 and 3.77 ppm (2m, 8H, –CH_2O–), δ=4.21 ppm (m, 4H, –C$\underline{H}_2$OCONH–), δ=4.31 ppm (m, 4H, –CH_2OCO–),
(c) δ=3.70 and 3.77 ppm (1s, 8H and 2m, 8H, –CH_2O–), δ=4.21 ppm (m, 4H, –C$\underline{H}_2$OCONH–), δ=4.31 ppm (m, 4H, –CH_2OCO–),
(d) δ=3.70 and 3.77 ppm (1s, 16H and 2m, 8H, –CH_2O–), δ=4.21 ppm (m, 4H, –C$\underline{H}_2$OCONH–), δ=4.31 ppm (m, 4H, –CH_2OCO–),
δ=5.59 and δ=6.14 (2s, 4H, CH_2=), δ=6.95 and 7.76 ppm (2s, 2H, –NHCOO–), δ=6,80 ppm (s, 1H, $C(3)_{ar}$, –CH=) and δ=7.24 ppm (d, 1H, $C(5)_{ar}$, –CH=), 7.05 ppm (d, 1H, $C(6)_{ar}$, –CH=).

Figure S6. The 1H NMR spectra of the OEGMMA/MDI series: (a) HEMA/MDI, (b) DEGMMA/MDI, (c) TEGMMA/MDI, (d) TTEGMMA/MDI.



δ=1.95 ppm (s, 6H, CH_3–), δ=3.87 ppm (s, 2H, Ar–CH_2–Ar),
(a) δ=4.4 ppm (s, 8H, –OCH_2CH_2O–),
(b) δ=3.70 and 3.77 ppm (2m, 8H, –CH_2O–), δ=4.21 ppm (m, 4H, –C<u>H</u>$_2$OCONH–), δ=4.31 ppm (m, 4H, –CH_2OCO–),
(c) δ=3.70 and 3.77 ppm (1s, 8H and 2m, 8H, –CH_2O–), δ=4.21 ppm (m, 4H, –C<u>H</u>$_2$OCONH–), δ=4.31 ppm (m, 4H, –CH_2OCO–),
(d) δ=3.70 and 3.77 ppm (1s, 16H and 2m, 8H, –CH_2O–), δ=4.21 ppm (m, 4H, –C<u>H</u>$_2$OCONH–), δ=4.31 ppm (m, 4H, –CH_2OCO–),
δ=5.59 and δ=6.14 (2s, 4H, CH_2=), δ=6.97 ppm (s, 2H, –NHCOO–), δ=7.08 ppm and δ=7.30 ppm (2d, 8H, $C(2,2',6,6')_{ar}$ and $C(3,3',5,5')_{ar}$, –CH=), 7,05 ppm (d, 1H, $C(6)_{ar}$, –CH=).

Figure S7. The exemplary FTIR spectra, showing the peak intensity decrease resulting from the polymerization of double bonds: HEMA/TDI (a), DEGMMA/MDI (b), TEGMMA/IPDI (c), and TTEGMMA/HMDI (d) (black—the monomer, gray—the polymer).