Ladder-Like Polysilsesquioxane Dielectrics for Organic Field-Effect Transistor Applications

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Fig. S1 (a) $^1$H NMR, (b) FT-IR, and (c) $^{29}$Si NMR spectra of LPSQ-TMS series studied in this paper.
Fig. S2 TGA profiles of LPSQ-TMS series studied in this work.

Fig. S3 θ-based γ values of LPSQ-TMS treated and untreated SiO₂ dielectrics.
Fig. S4 AFM topography of 20 nm thick pentacene film on the LPMASQ82-TMS treated SiO$_2$ surface.
Fig. S5 (a–c) 1D out-of-plane X-ray diffraction profiles extracted along the $Q_z$ axis from the 2D GIXD patterns of (a) LPMASQ82-, (b) LPPrSQ82-, (c) LPNSQ-TMS treated SiO$_2$ systems. (d) Variations in $D$ and $\mu_{\text{FET}}$ of 50 nm thick pentacene films on the LPSQ-treated SiO$_2$ dielectrics.
Fig. S6 Typical $I_D-V_G$ transfer and $I_G-V_G$ gate leakage curves of pentacene OFETs on the treated SiO$_2$ dielectrics including: (a) LPPSQ-, (b) LPMASQ82-, (c) LPMASQ64-, (d) LPMSQ-, (e) LPPrSQ-, (f) LPPrSQ82-, (g) LPFSQ-, and (h) LPNSQ-TMS layers.
Fig. S7 $I_D-V_G$ transfer curves of 50 nm pentacene OFETs on the (a) untreated and (b–d) LPSQ-TMS treated SiO$_2$ dielectrics including: (b) LPPSQ-, (c) LPMASQ82-, and (d) LPPrSQ82-, under a sustained gate bias of $V_G = -60$ V as a function of stress time ($t$).
Fig. S8 FT-IR spectra of LPMASQ82-TMS/PMFM (95/5) before and after thermal curing.

Fig. S9 (a) Current density and (b) $C_i$ profile of 500 nm thick LPMASQ82-TMS film with $\varepsilon_r$ of 2.77.
Fig. S10 Chemical structure of poly(melamine-co-formaldehyde), acrylated.