Electronic Supplementary Information:

Main chain dendronized hyperbranched polymers: Convenient synthesis and good second-order nonlinear optical performance

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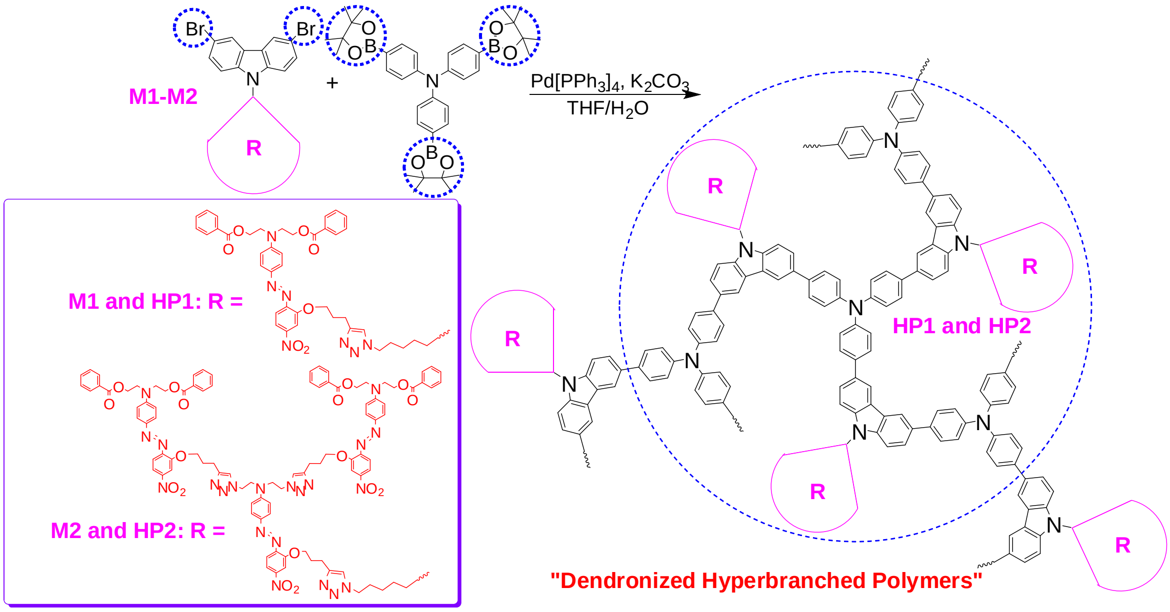

Chart S1. The structure of dendronized hyperbranched polymers **HP1** and **HP2**.

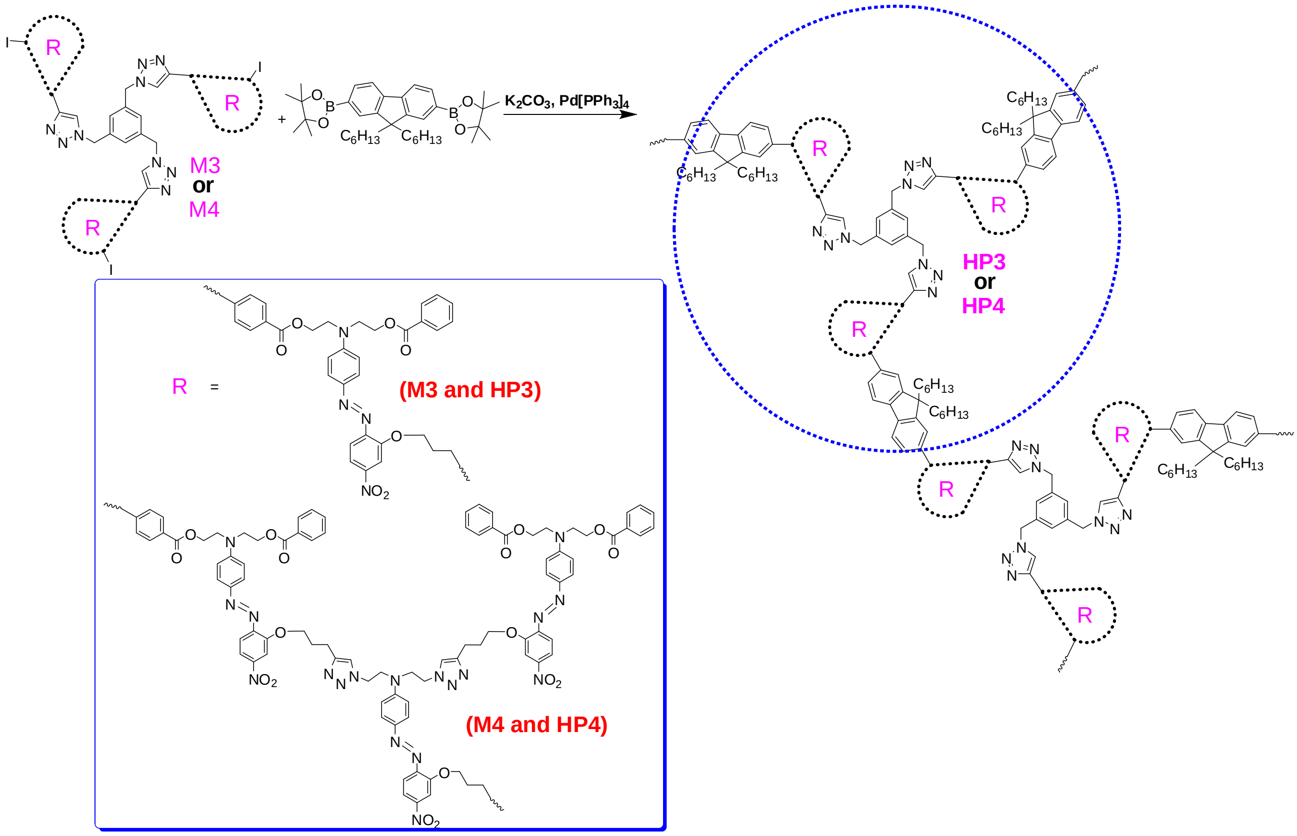

Chart S2. The structure of dendronized hyperbranched polymers **HP3** and **HP4**.

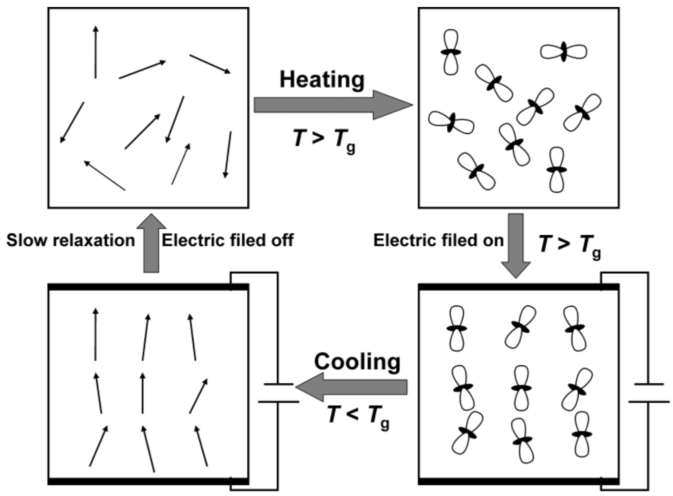

Chart S3. Graphical illustration of poling procedure for NLO polymers.

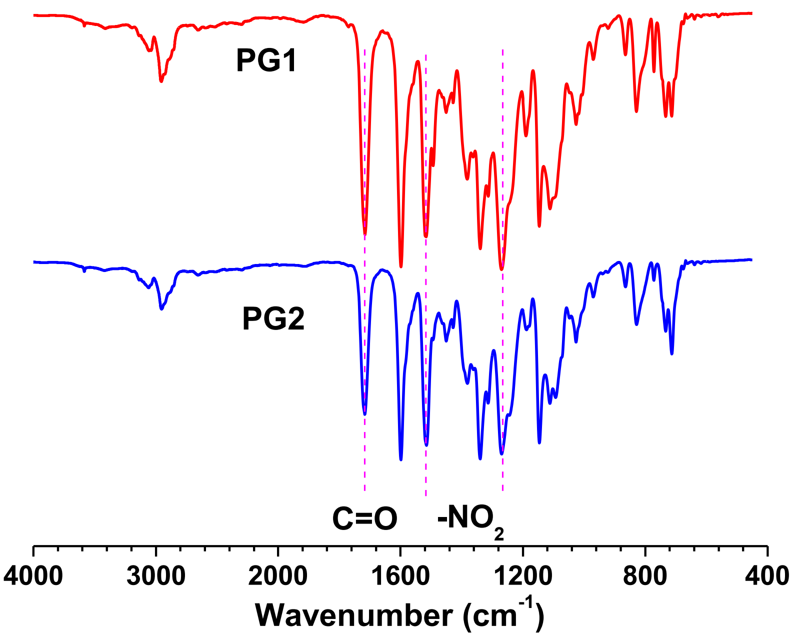

Fig. S1 The FT-IR spectra of main chain dendronized hyperbranched polymers **PG1** and **PG2**.

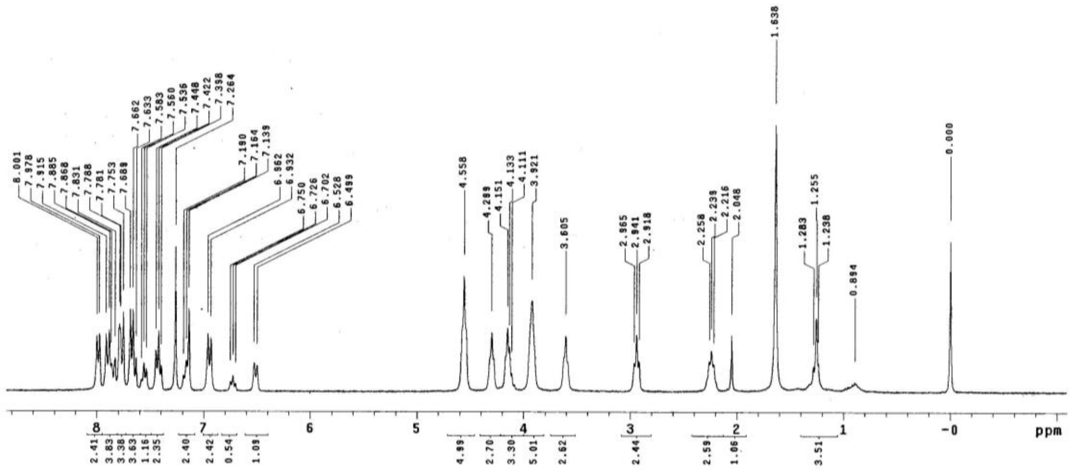

Fig. S2 ^{1}H NMR spectrum of **MG1** in chloroform-*d*.

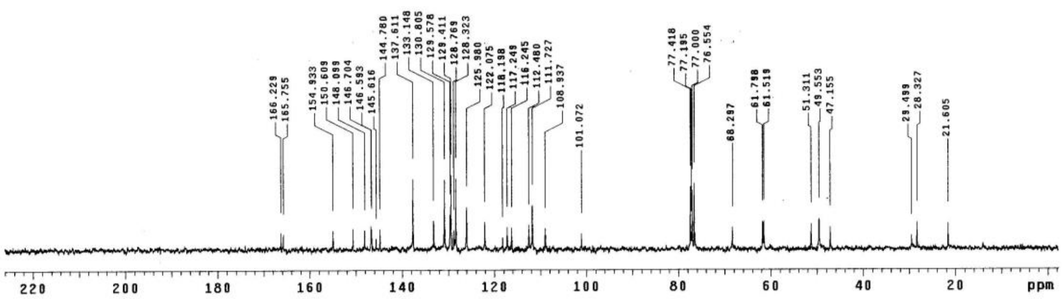

Fig. S3 ^{13}C NMR spectrum of **MG1** in chloroform-*d*.

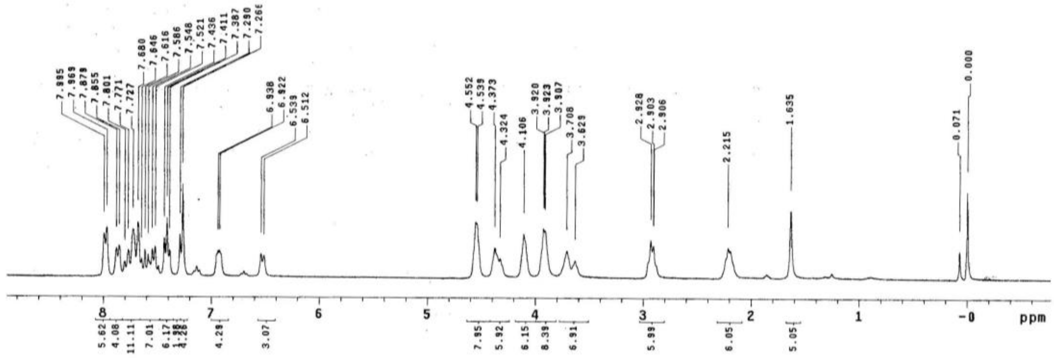

Fig. S4 ^{1}H NMR spectrum of **MG2** in chloroform-*d*.

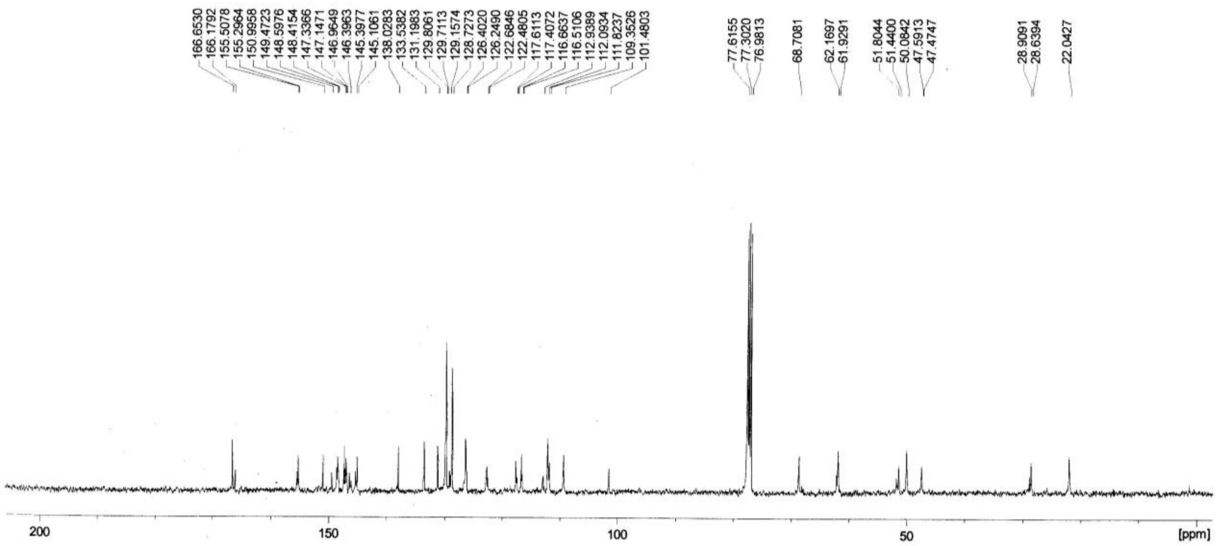

Fig. S5 ^{13}C NMR spectrum of **MG2** in chloroform-*d*.

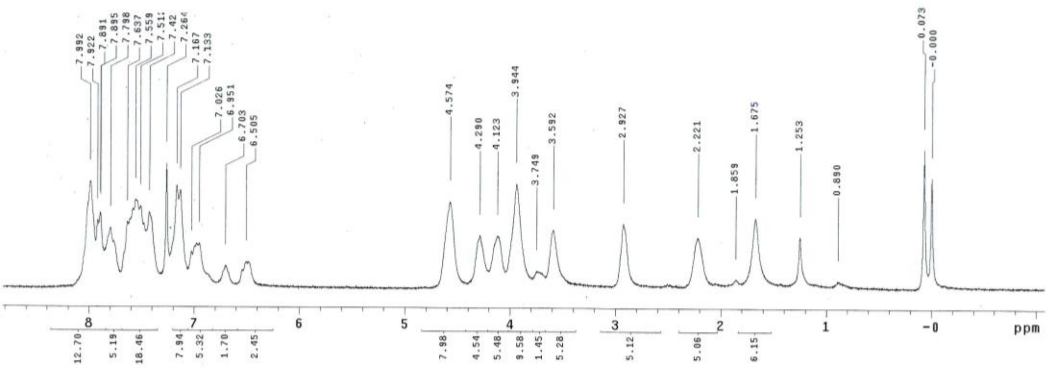

Fig. S6 ^{1}H NMR spectrum of **PG1** in chloroform-*d*.

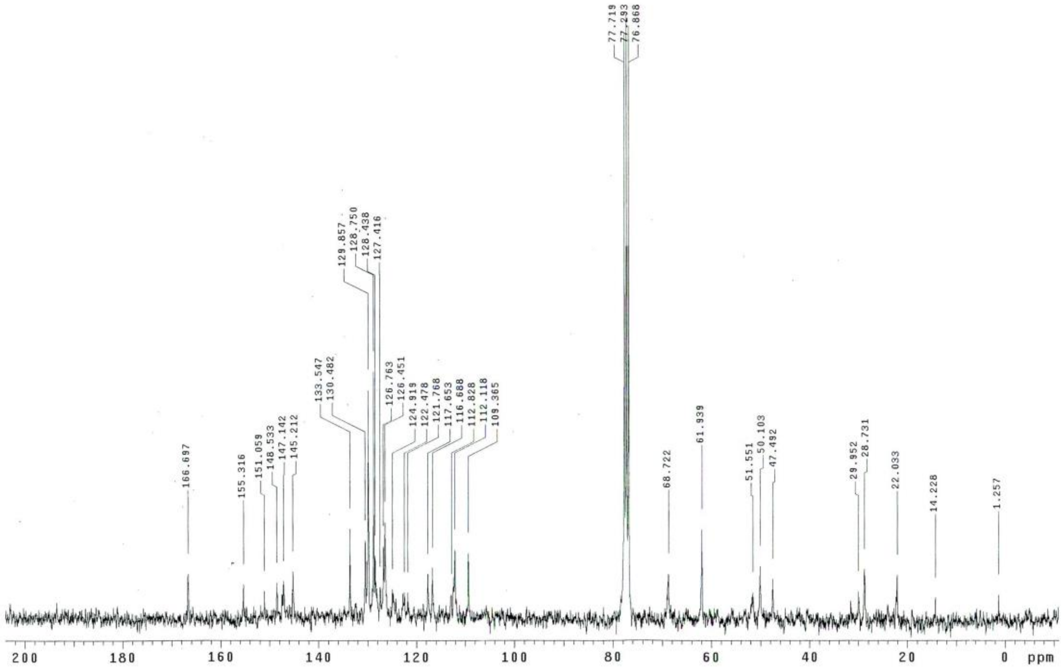

Fig. S7 ^{13}C NMR spectrum of **PG1** in chloroform-*d*.

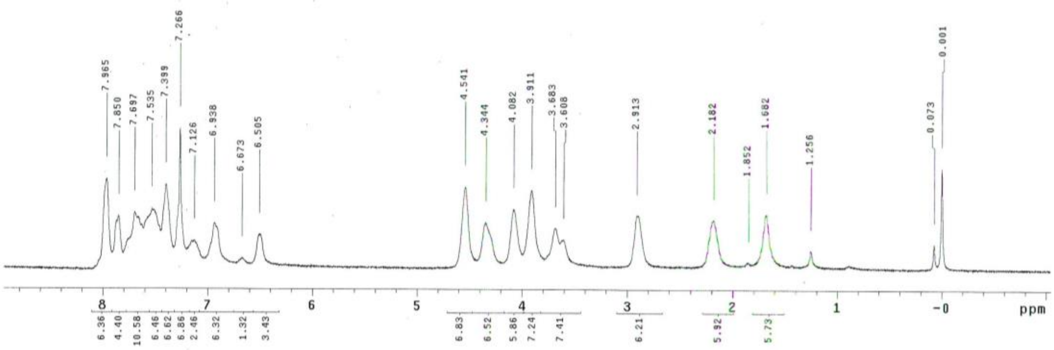

Fig. S8 ^{1}H NMR spectrum of **PG2** in chloroform-*d*.

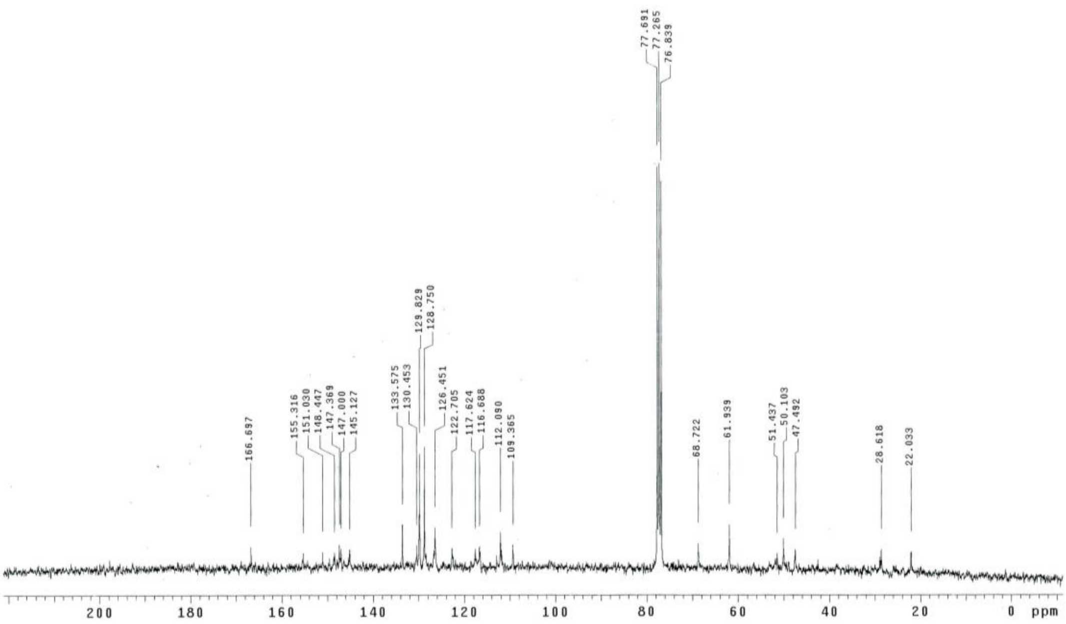

Fig. S9 ^{13}C NMR spectrum of **PG2** in chloroform-*d*.

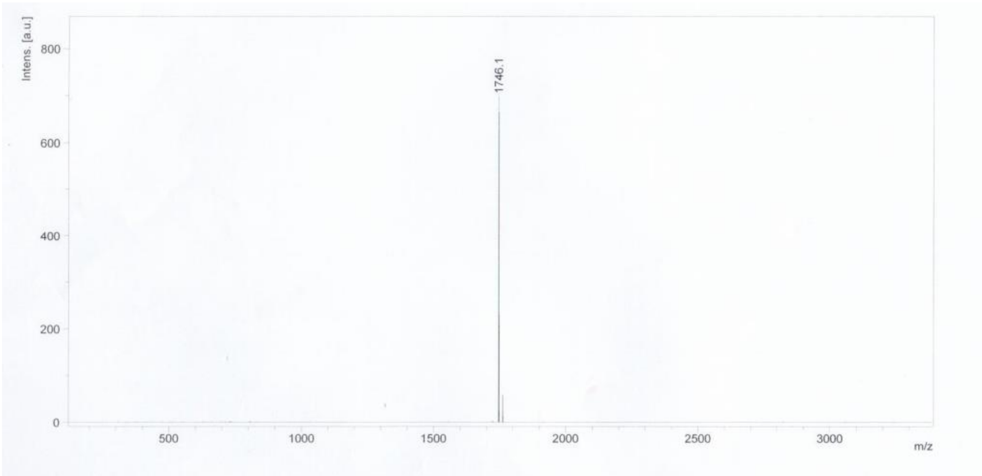

Fig. S10 The MALDI-TOF mass spectrum of **MG1**.

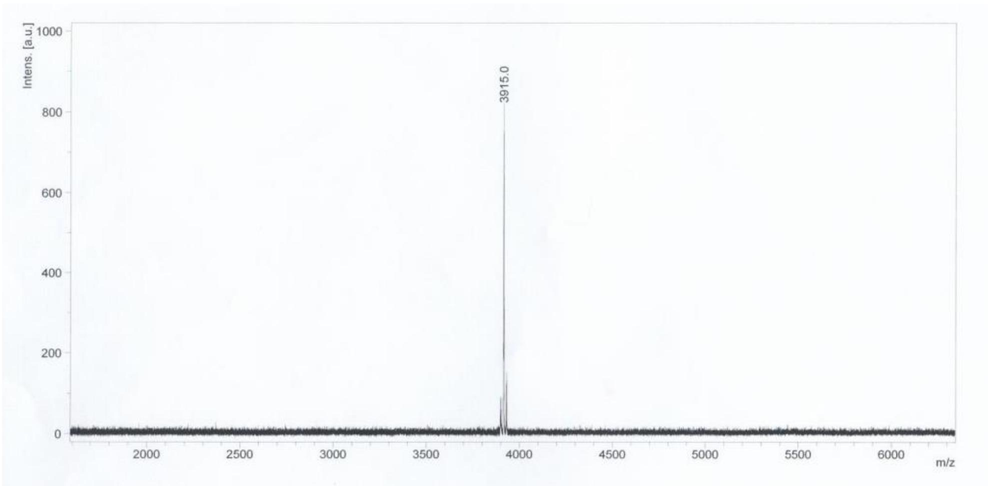

Fig. S11 The MALDI-TOF mass spectrum of **MG2**.

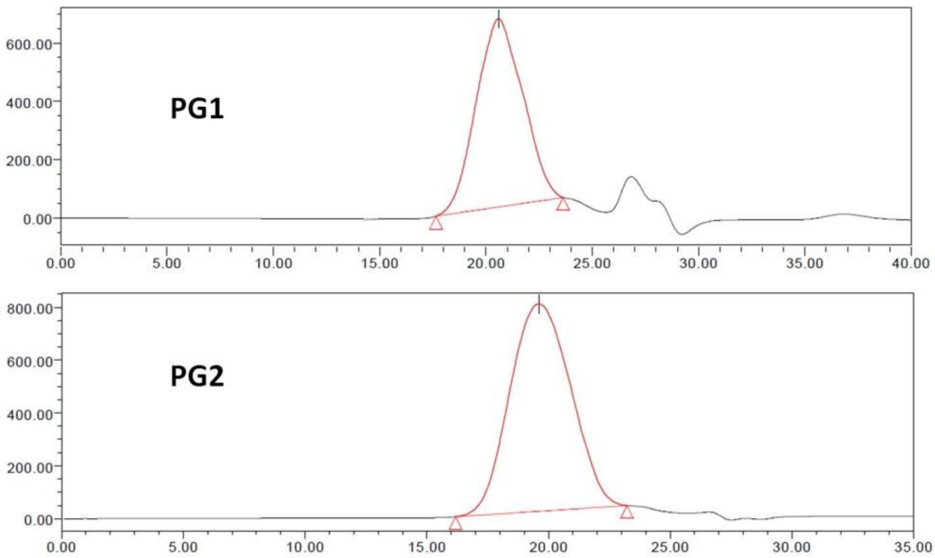

Fig. S12 The GPC chromatograms of **PG1** and **PG2**.

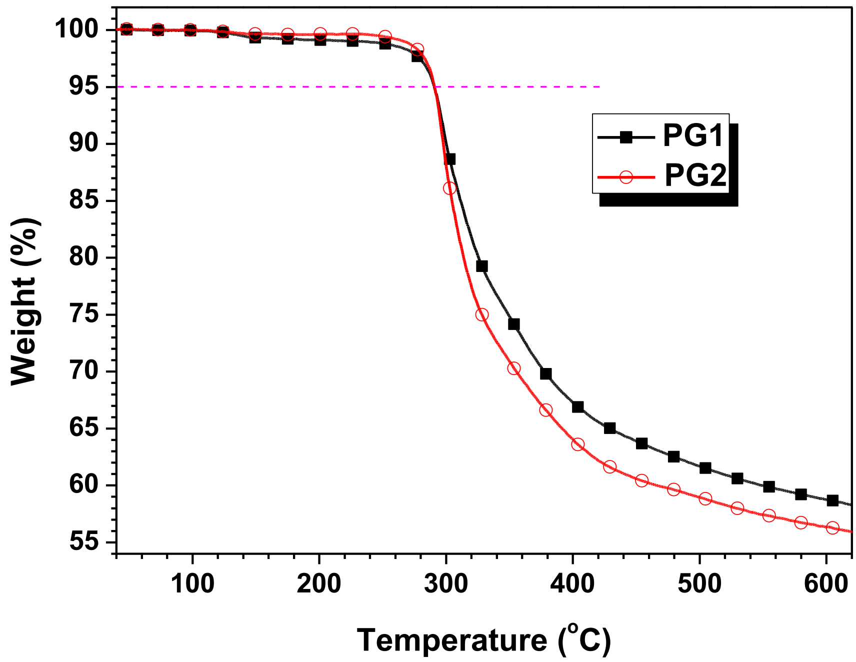

Fig. S13 TGA thermograms of main chain dendronized hyperbranched polymers **PG1** and **PG2**, measured in nitrogen at a heating rate of 10 ℃/min.

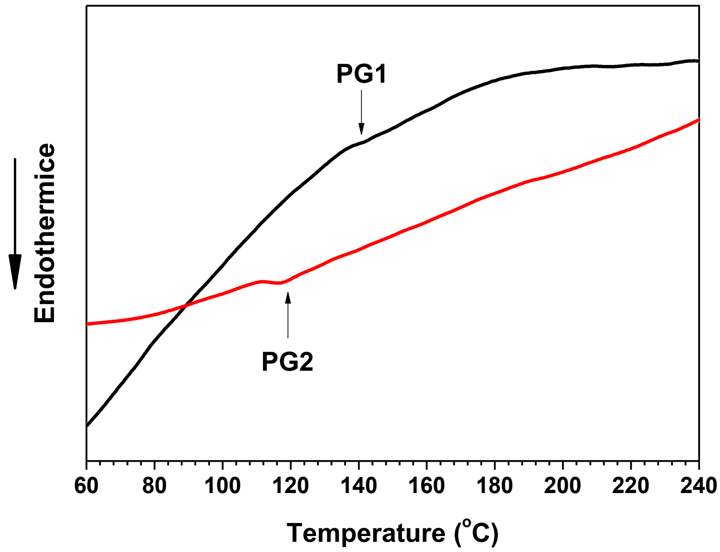

Fig. S14 DSC thermograms of main chain dendronized hyperbranched polymers **PG1** and **PG2**, measured in nitrogen at a heating rate of 10 ℃/min.

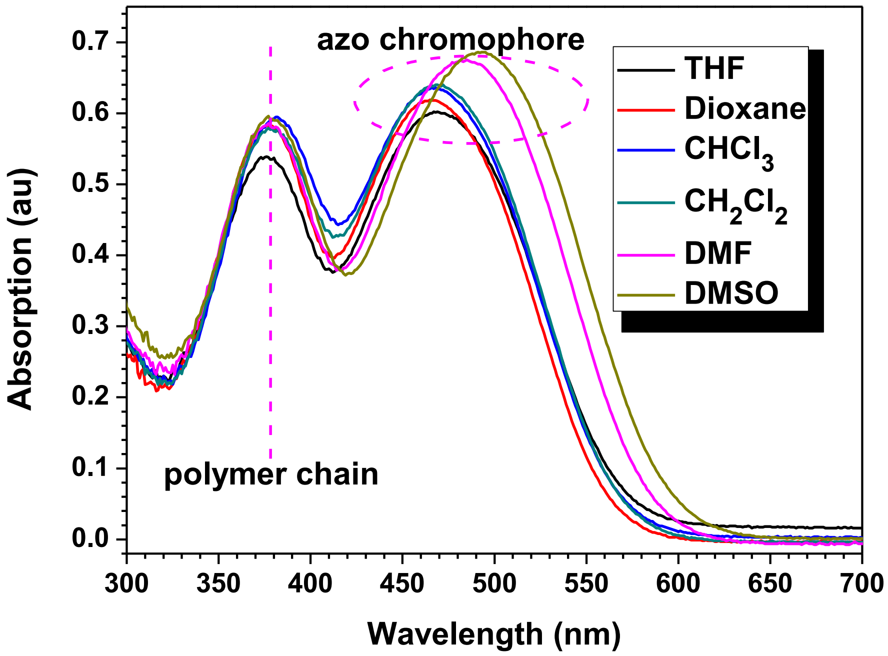

Fig. S15 UV-Vis spectra of **PG1** in different solutions (0.02 mg/mL).

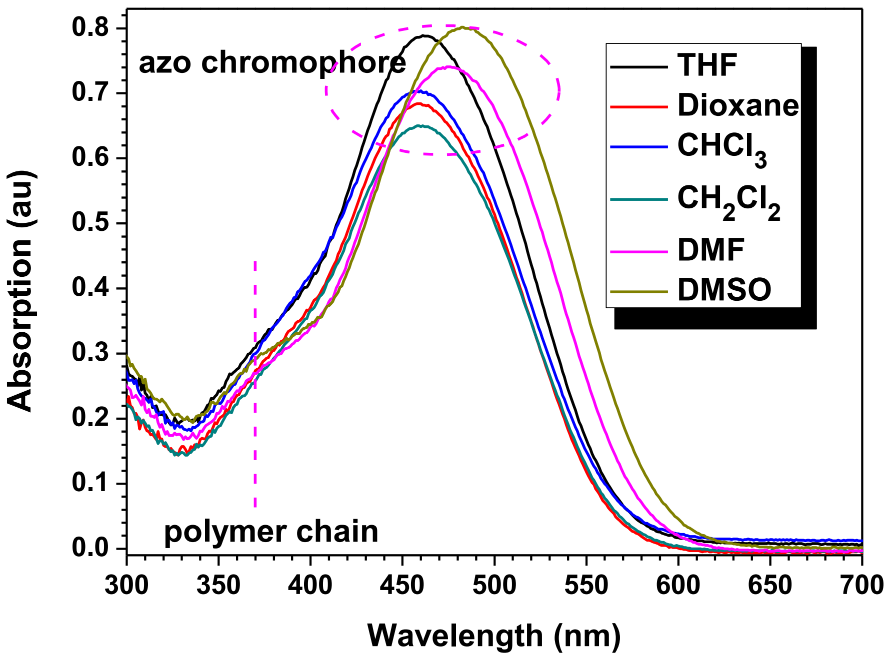

Fig. S16 UV-Vis spectra of **PG2** in different solutions (0.02 mg/mL).

Calculation of the NLO coefficients:

In this paper, we used second harmonic generation (SHG) processes, a typical second-order NLO effect, to express the NLO coefficients of the dendronized hyperbranched polymers. Calculation of the SHG coefficients (d_{33}) for the poled films is based on the following equation:

$$\frac{d_{33,s}}{d_{11,q}} = \frac{\chi_s^{(2)}}{\chi_q^{(2)}} = \sqrt{\frac{I_s}{I_q}} \frac{l_{c,q}}{l_s} F$$

where $d_{11,q}$ is d_{11} of the quartz crystals, which is equal to 0.45 pm/V. I_s and I_q are the SHG intensities of the sample and the quartz, respectively, $l_{c,q}$ is the coherent length of the quartz, l_s is the thickness of the polymer film, and F is the correction factor of the apparatus and is equal to 1.2 when l_c is much greater than l_s.

Thus, from the SHG intensities of the dendronized hyperbranched polymers and the quartz, as well as the film thickness of the tested thin films, we can calculate the d_{33} value of dendronized hyperbranched polymers easily.

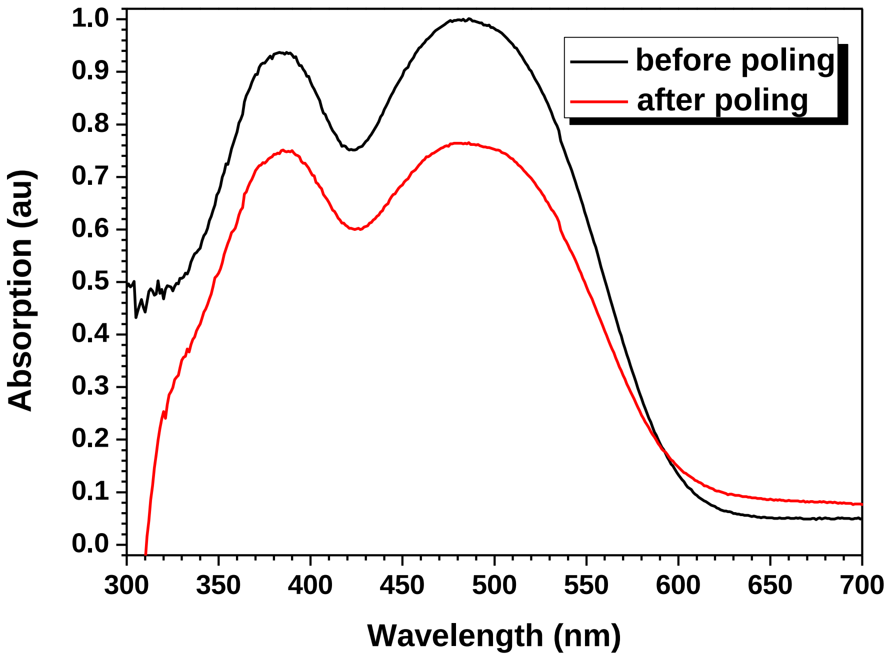

Fig. S17 Absorption spectra of the film of **PG1** before and after poling.

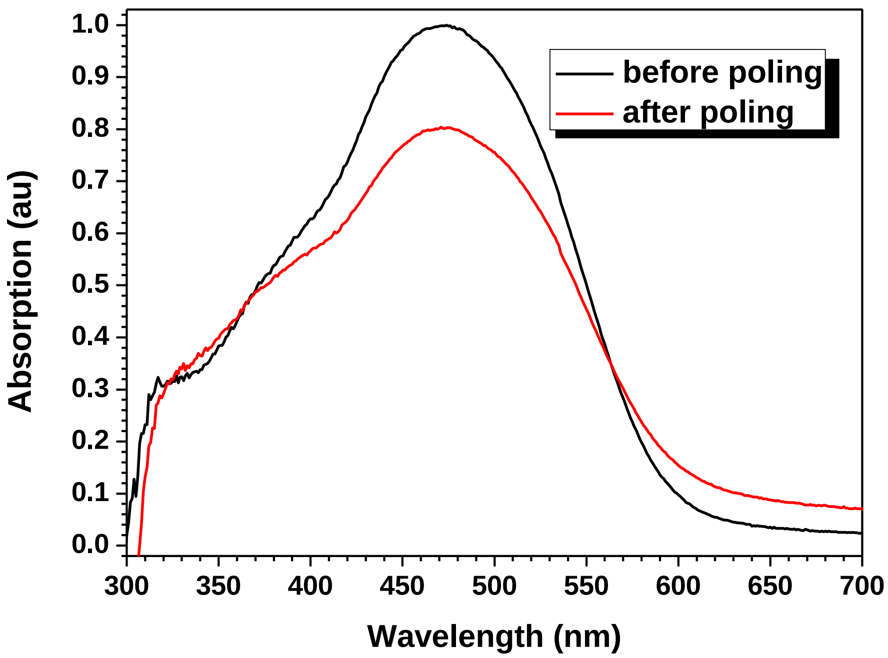

Fig. S18 Absorption spectra of the film of **PG2** before and after poling.