

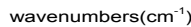
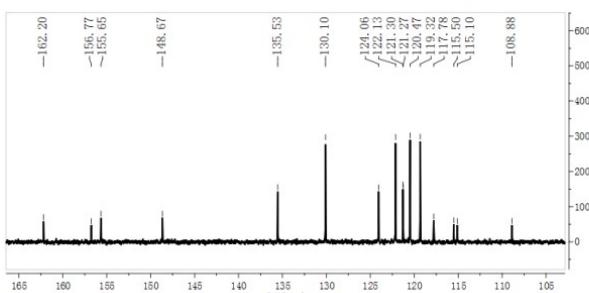
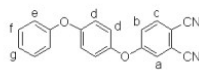
Supporting Information

**100% Hyperbranched Polymers via Acid-Catalyzed Friedel-Crafts
Aromatic Substitution Reaction**

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Chemical structure of 4,4'-oxydiphenylacetic acid (ODPA) is shown with protons labeled a through f. The structure consists of two phenyl rings connected by an ether oxygen atom, with a carboxylic acid group (-COOH) attached to one of the rings. The protons are labeled as follows: 'a' for the aromatic protons ortho to the ether oxygen, 'b' for the aromatic protons meta to the ether oxygen, 'c' for the aromatic protons para to the ether oxygen, 'd' for the aromatic protons ortho to the carboxylic acid group, 'e' for the aromatic protons meta to the carboxylic acid group, and 'f' for the aromatic protons para to the carboxylic acid group. The structure also includes a carboxylic acid group (-COOH) attached to the other ring.

The ^1H NMR spectrum (DMSO- d_6) shows the following peaks and integrations:

- Peak 'c' (aromatic protons para to the ether oxygen) at $\delta \approx 7.8$ ppm, integration 1.00.
- Peak 'a + b' (aromatic protons ortho and meta to the ether oxygen) at $\delta \approx 7.4$ ppm, integration 1.00.
- Peak 'd + e + f + g' (aromatic protons ortho, meta, and para to the carboxylic acid group) at $\delta \approx 7.1$ ppm, integration 1.00.
- Reference peak for DMSO- d_6 at $\delta = 2.50$ ppm.

The x-axis represents the chemical shift in ppm, ranging from 15 to 0. The y-axis represents the intensity, ranging from -2000 to 2600.

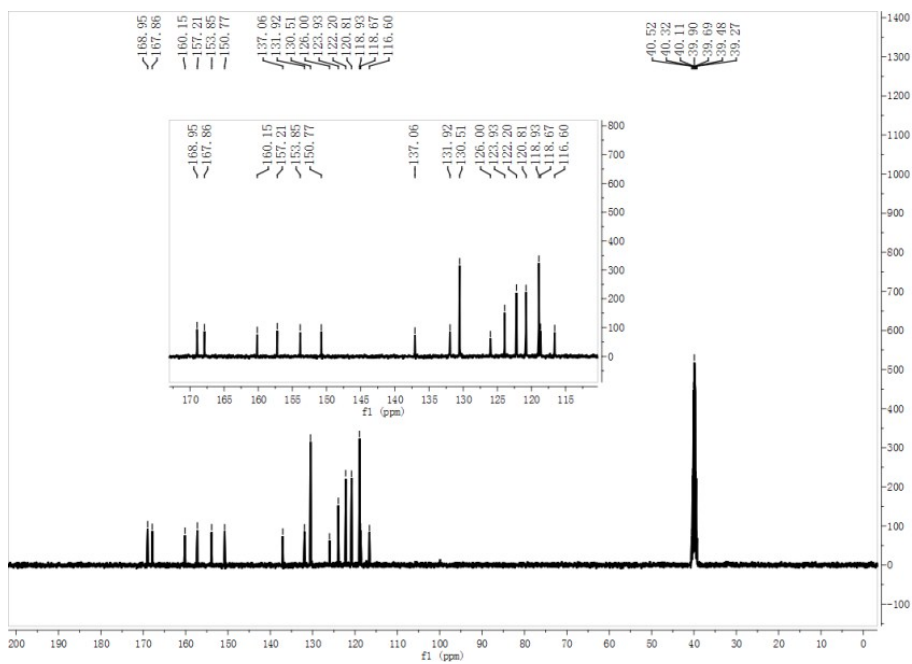


Figure 1 displays the ^1H , ^{13}C , and IR spectra of compound **1**. The chemical structure of **1** is shown in the top left corner, with protons labeled a through f.

The top panel shows the ^1H NMR spectrum (400 MHz, CDCl_3) with peaks labeled a through f. The middle panel shows the ^{13}C NMR spectrum (100 MHz, CDCl_3) with peaks labeled a through f. The bottom panel shows the IR spectrum (KBr).

Figure S3 FT-IR, ^1H NMR and ^{13}C NMR spectra of AB₂ monomer.

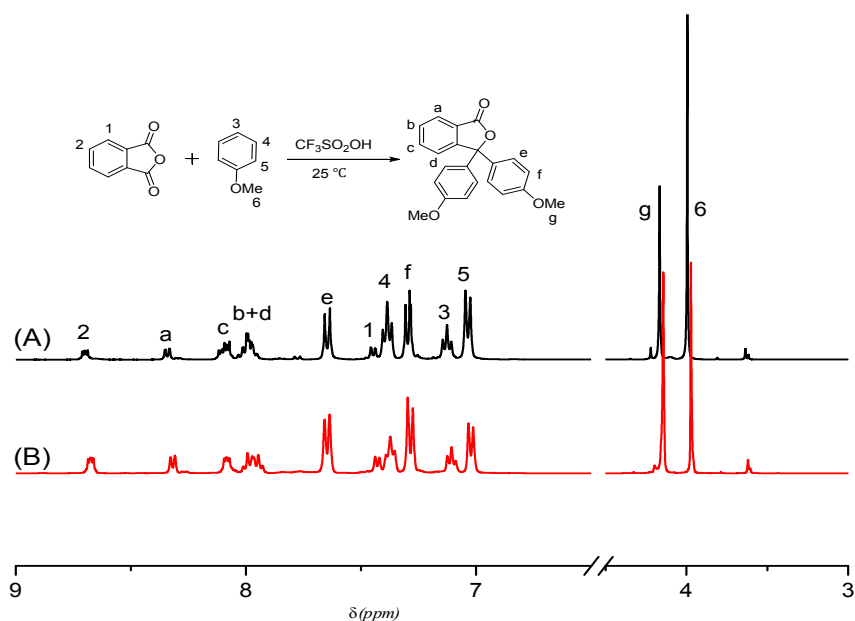


Figure S4 ^1H NMR spectra in CDCl_3 of products obtained by the model reaction between isobenzofuran-1, 3-dione(1 mmol) and anisole(2 mmol) in the presence of $\text{CF}_3\text{SO}_3\text{H}$ (1 mL); (A) $t = 30$ min. (B) $t = 5$ h.

The model reaction between isobenzofuran-1, 3-dione(1 mmol) and anisole(2 mmol) is carried out in the presence of trifluoromethanesulfonic acid (TFSA) at 25 °C. The model reaction was monitored by using ^1H NMR spectroscopy. The ^1H NMR spectra show the formation of the expected diarylated products **3**, and no peaks corresponding to the monosubstituted compounds and other side reaction products are observed. Based on these findings and our knowledge about the superelectrophile, we think that the condensation proceeds via alcohol intermediates, whose reactivity is much higher than that of the starting material.

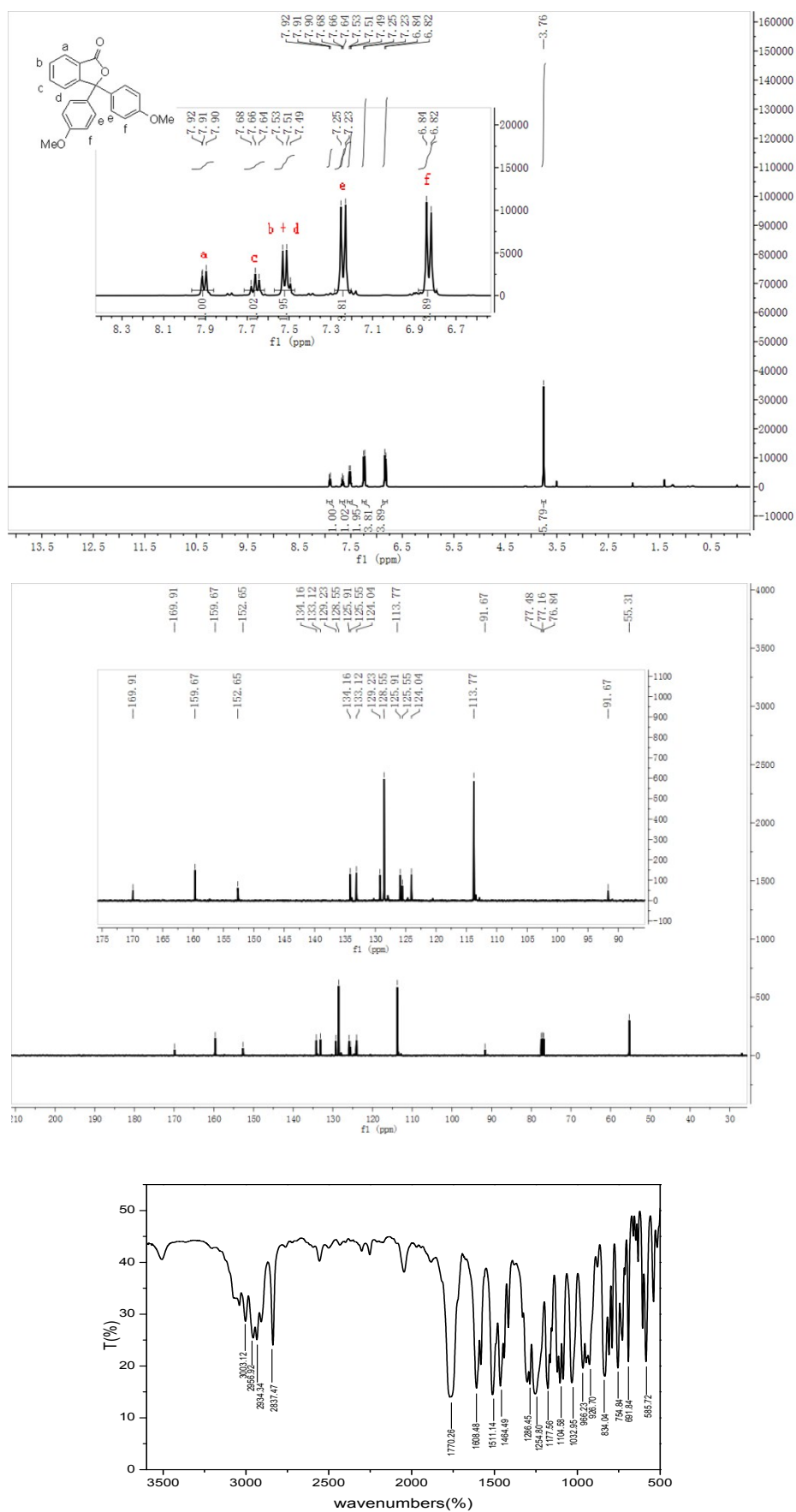


Figure S5 FT-IR, ¹H NMR and ¹³C NMR spectra of model compound **3**.

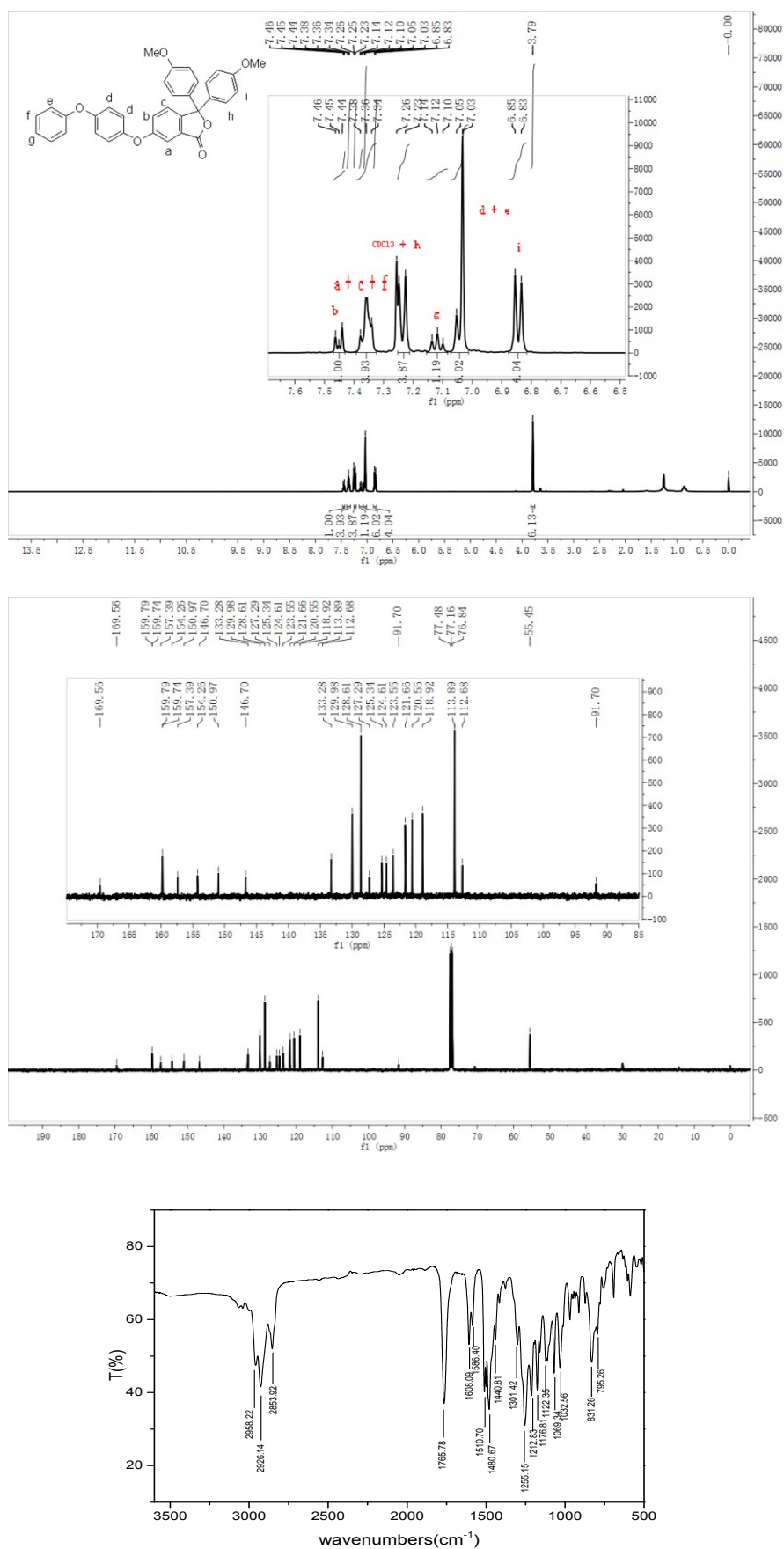


Figure S6 FT-IR, ¹H NMR and ¹³C NMR spectra of model compound 4.

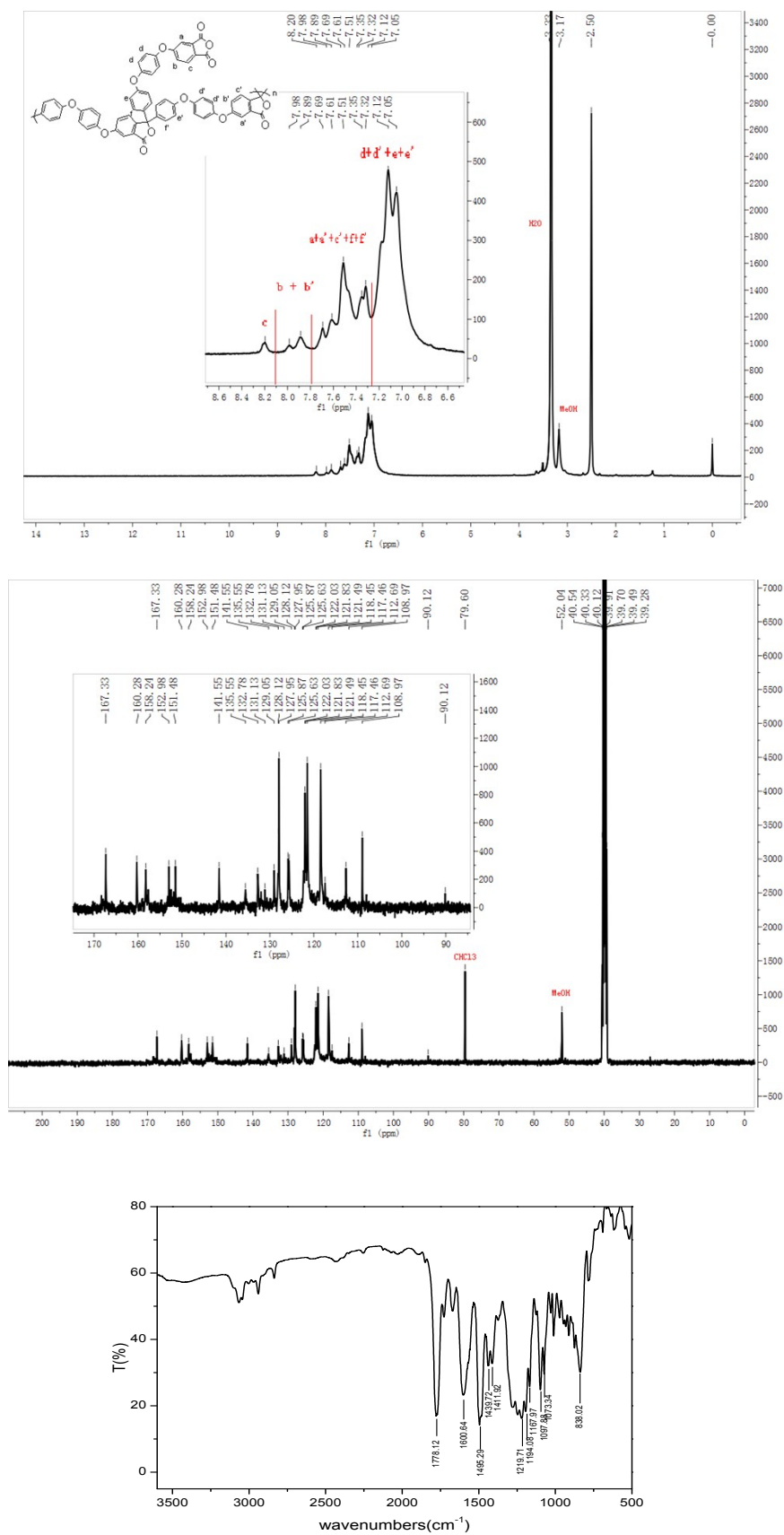


Figure S7 FT-IR, ¹H NMR and ¹³C NMR spectra of hyperbranched polymer **a1**.

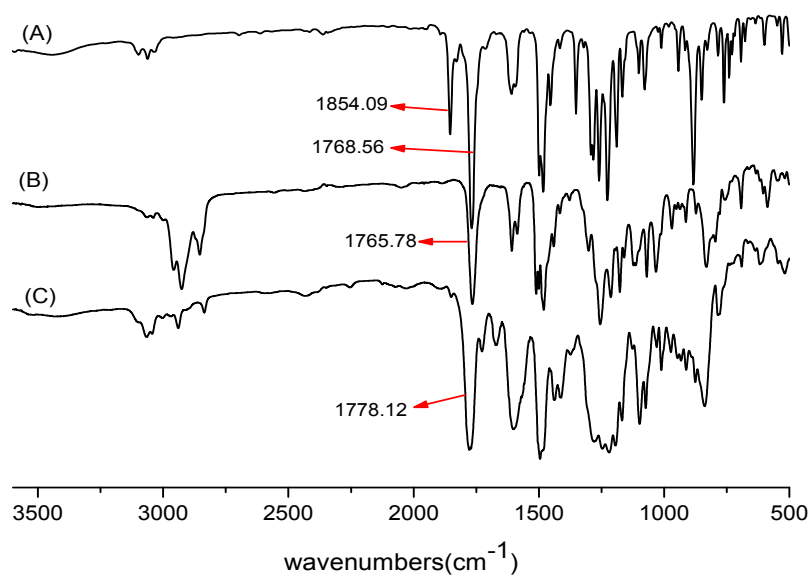
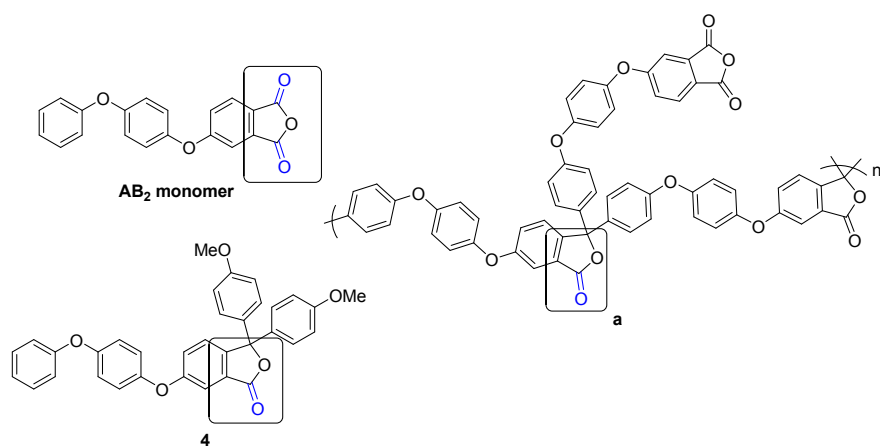


Figure S8 FT-IR spectra of (A) **AB₂** monomer, (B) model compound **4**, and (C) hyperbranched polymer **a1**.