Supplementary information

Facile, efficient synthesis of a phosphinated hydroxyl diamine, and properties of its high-performance poly(hydroxyl imides) and polyimide/SiO_2 hybrids

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Table S1. GPC and solubility data of poly (hydroxyl imides) **2**

Polyimide	GPC Data [a]		Solubility data[c]					
	M_n[b] ($\times10^4$)	M_w[c] ($\times10^4$)	NMP	DMAc	DMSO	m-cresol	THF	CH_2Cl_2
2a	-	-	±	±	±	±	—	—
2b	-	-	+h	±	±	+h	—	—
2c	-	-	±	±	—	±	—	—
2d	-	-	+h	±	±	+h	—	—
2e	6.3	10.4	+	+	+	+	+	±

[a] Relative to polystyrene standard, using THF as eluent. [b]M_n: number-average molecular weight, M_w: weight-average molecular weight. [c]Solubility was tested with a 5 mg sample in 0.5 g of solvent at room temperature.. +, soluble; +h, soluble on heating; ±, partially soluble on heating; -, insoluble on heating.

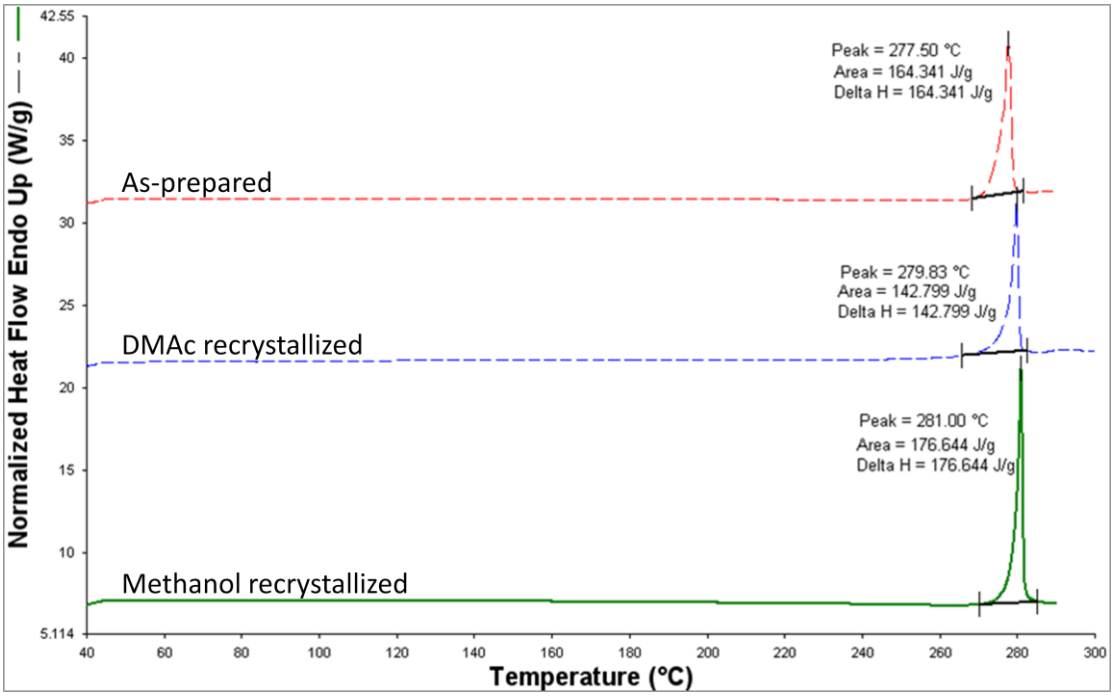

Figure S1. DSC thermograms of as-prepared, and DMAc or methanol recrystallized product**.**

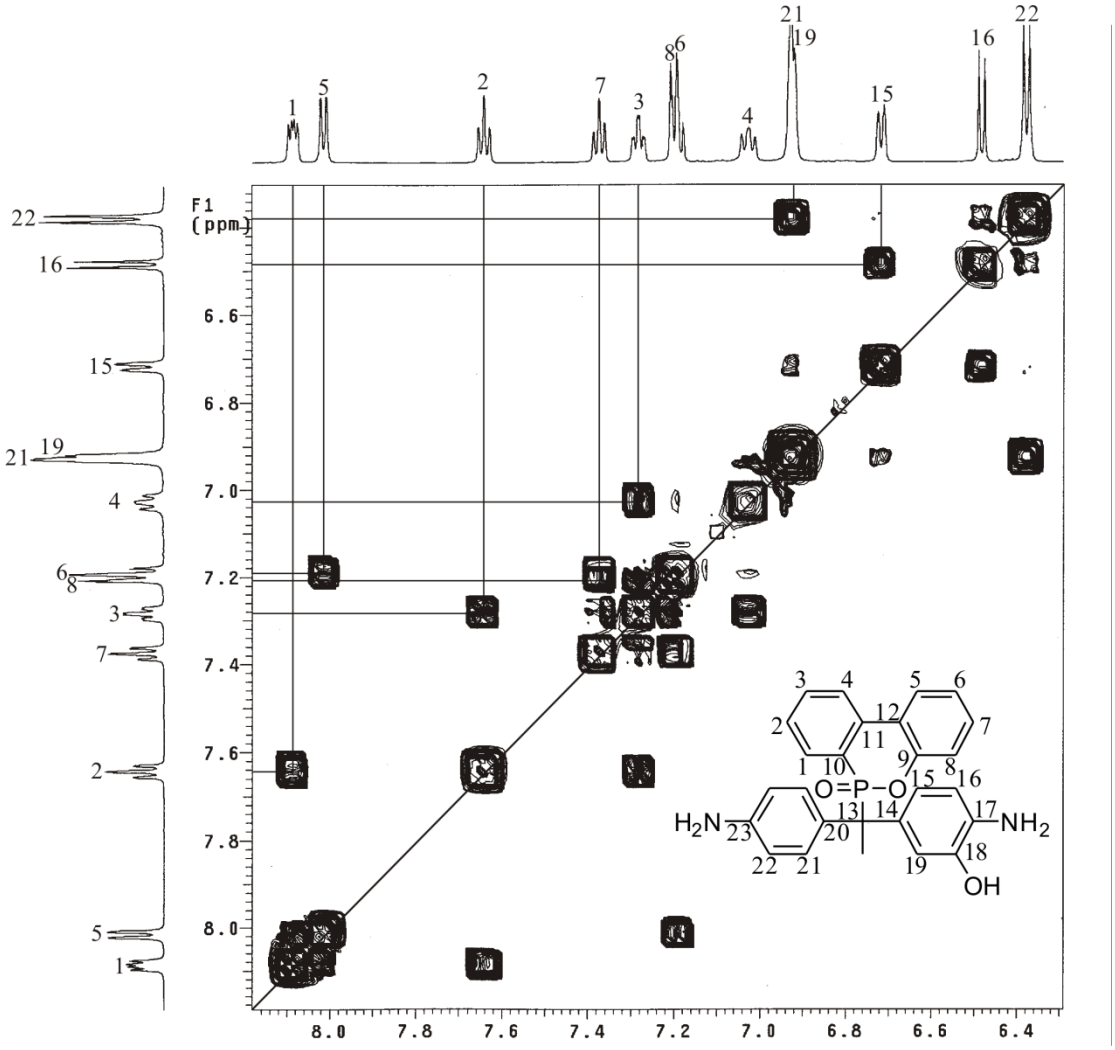

Figure S2. ^{1}H-^{1}H COSY NMR spectrum of **(1)**.

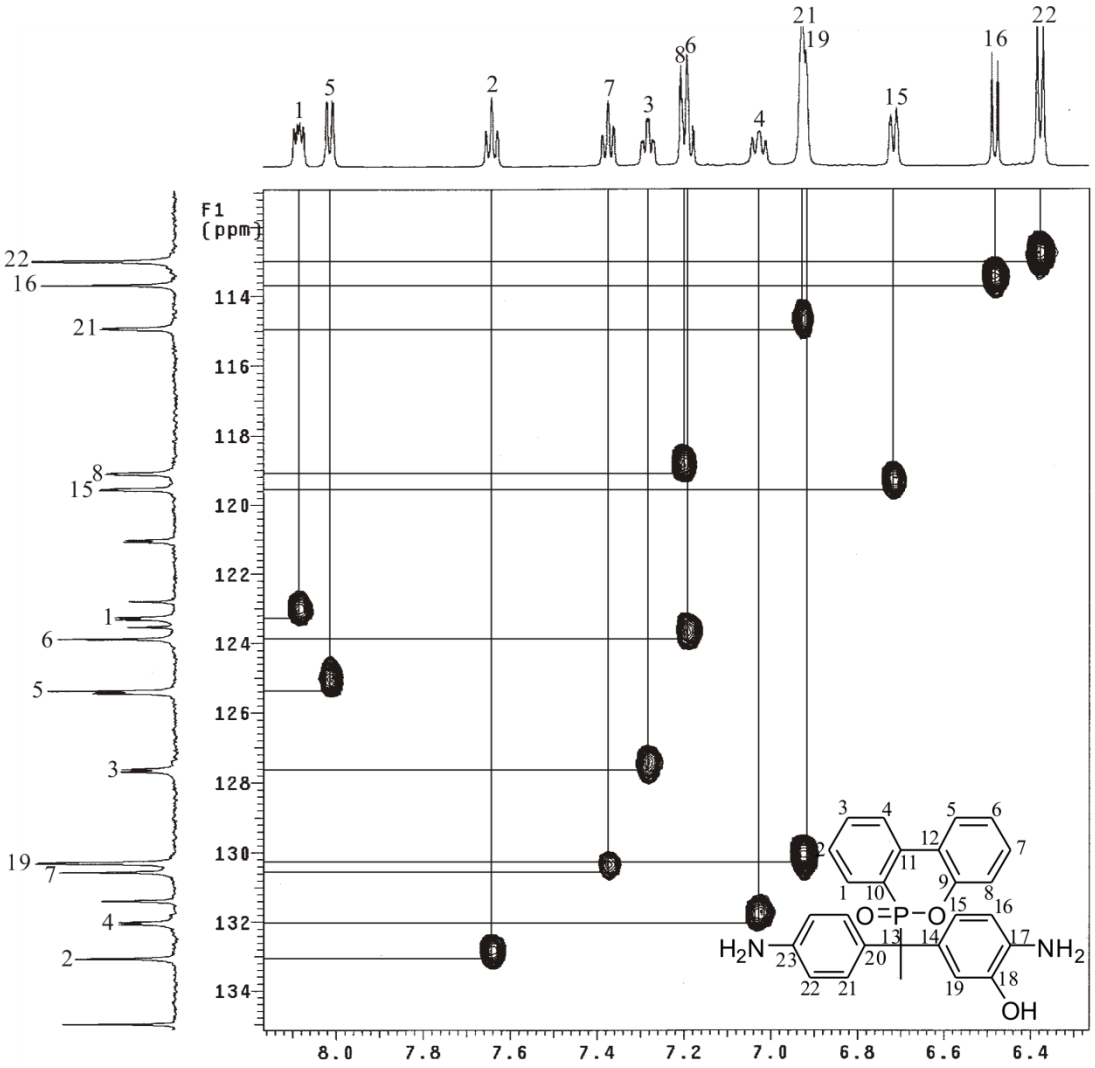

Figure S3. ^{1}H-^{13}C HETCOR NMR spectrum of **(1)**.

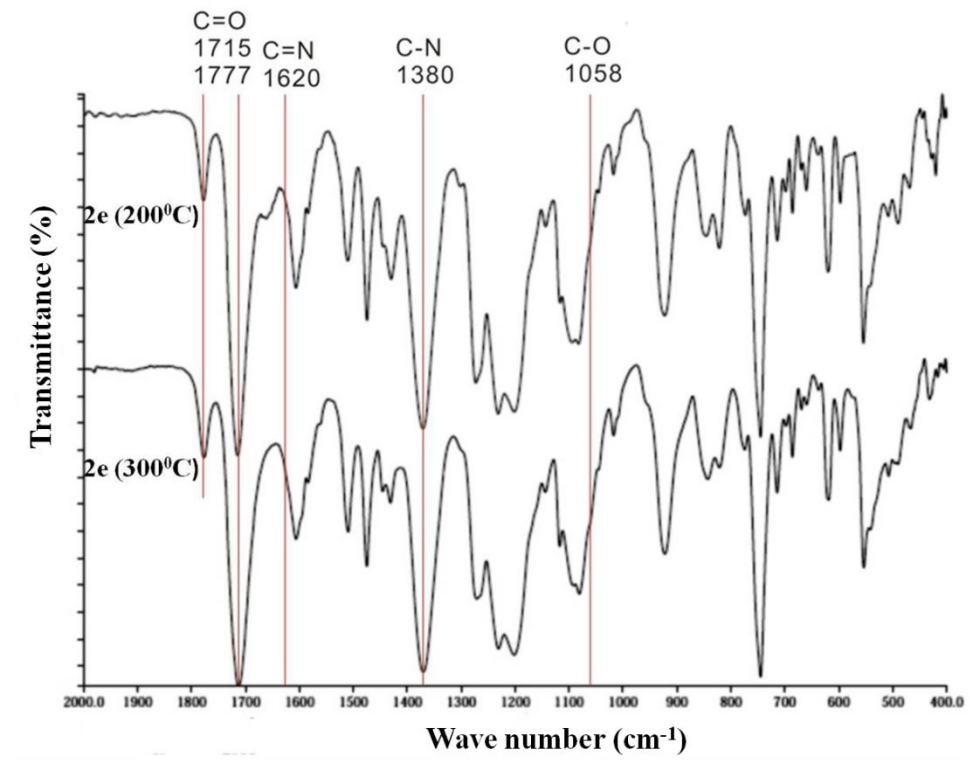

Figure S4. IR spectra of solution-polymerization **2e** after thermal treatment at 200 ^{o}C (1h) and 300 ^{o}C (1h).

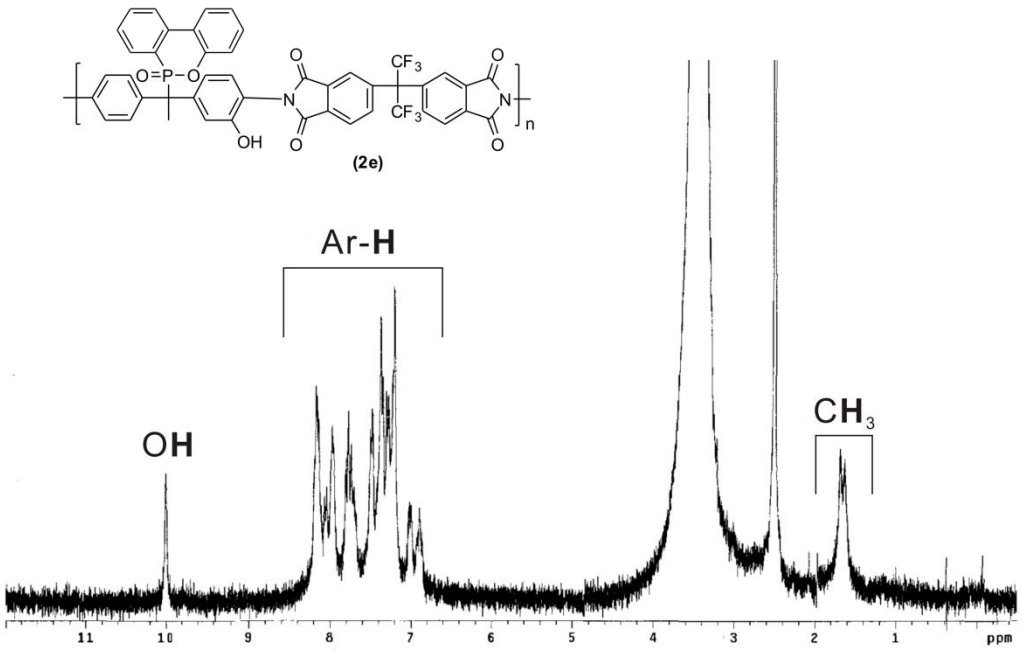

Figure S5. ^{1}H NMR spectrum of **2e**.

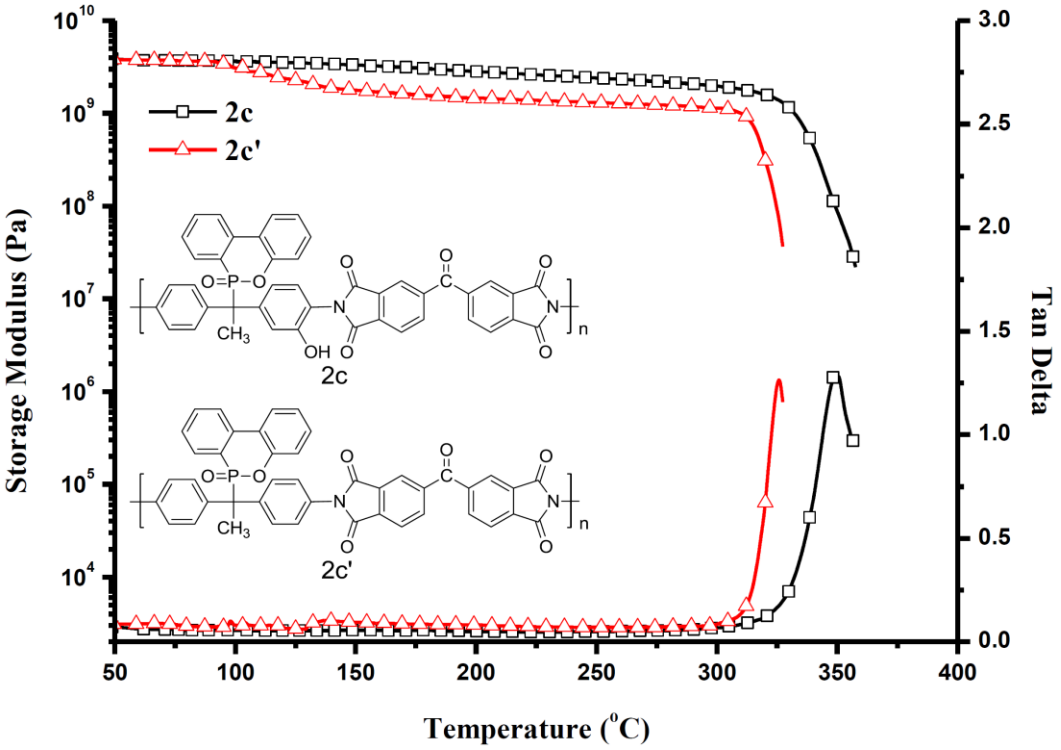

Figure S6. DMA thermograms of **2c** and **2c'**.

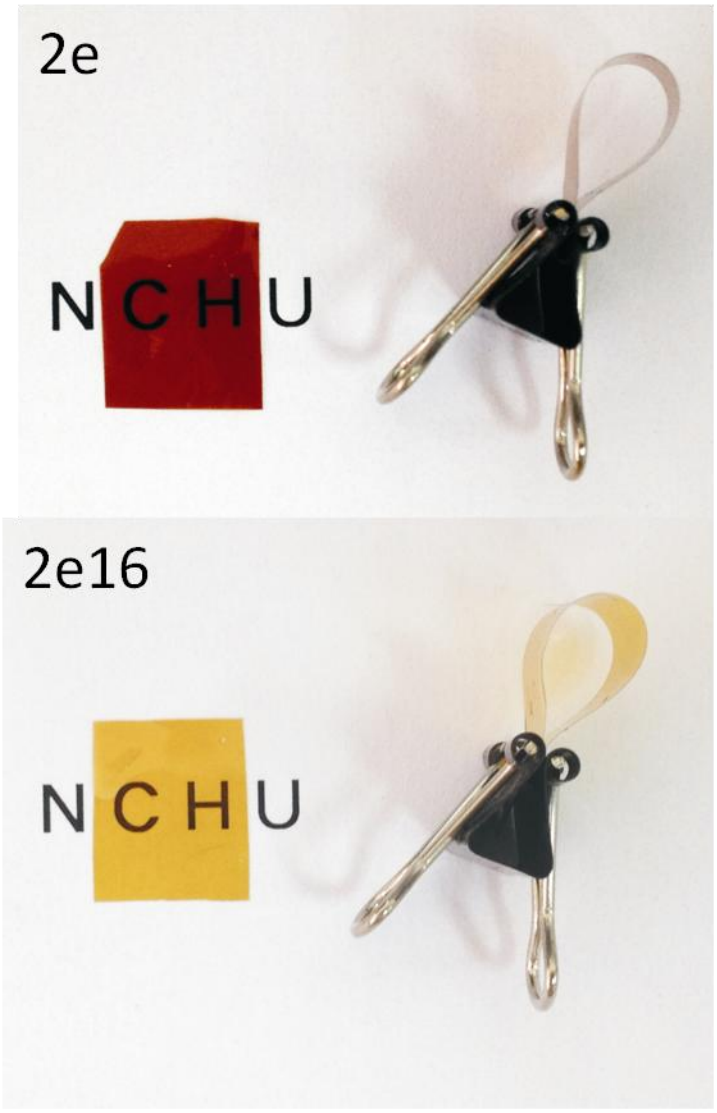

Figure S7. Pictures of **2e** and **2e16**.

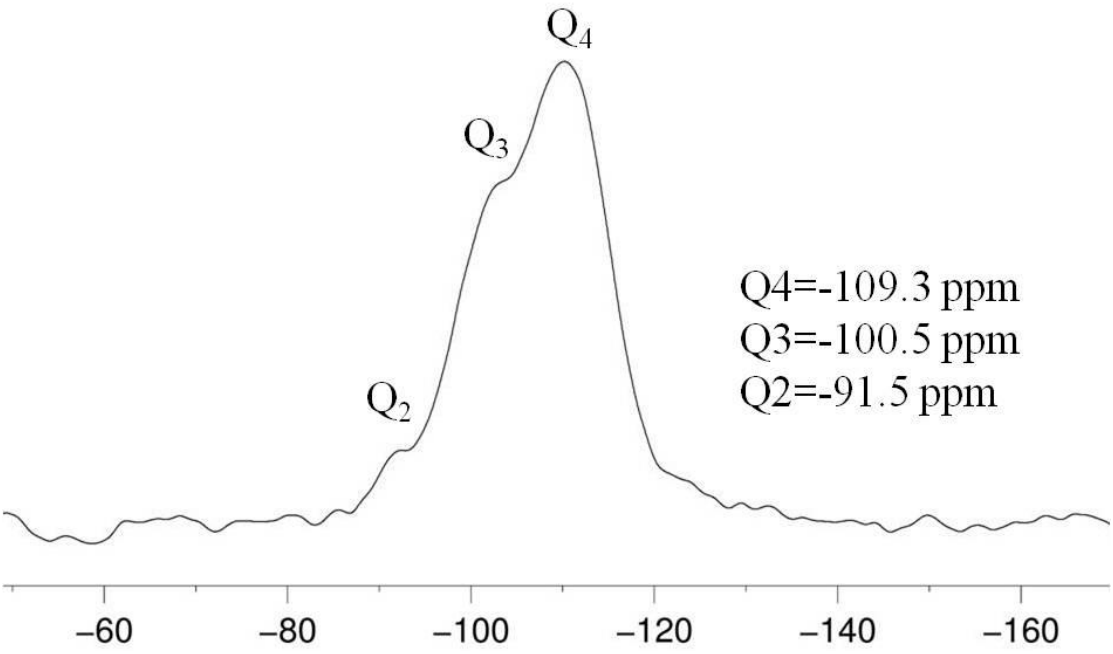

Figure S8. Solid-state ^{29}Si NMR spectrum of **2e16**.