Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information for

From seleno-mediated radical polymerization to seleno-containing branched polymer and dynamic hydrogel

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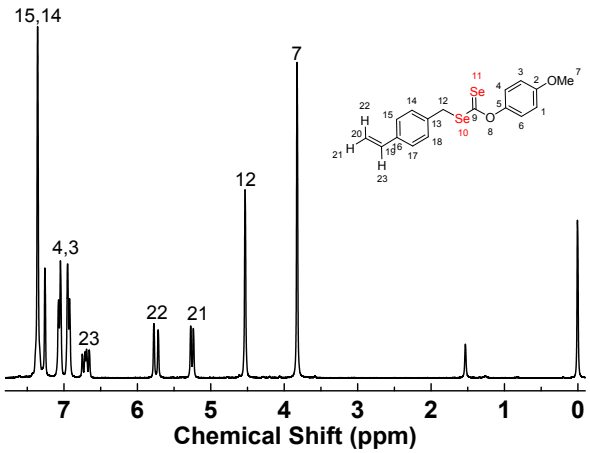

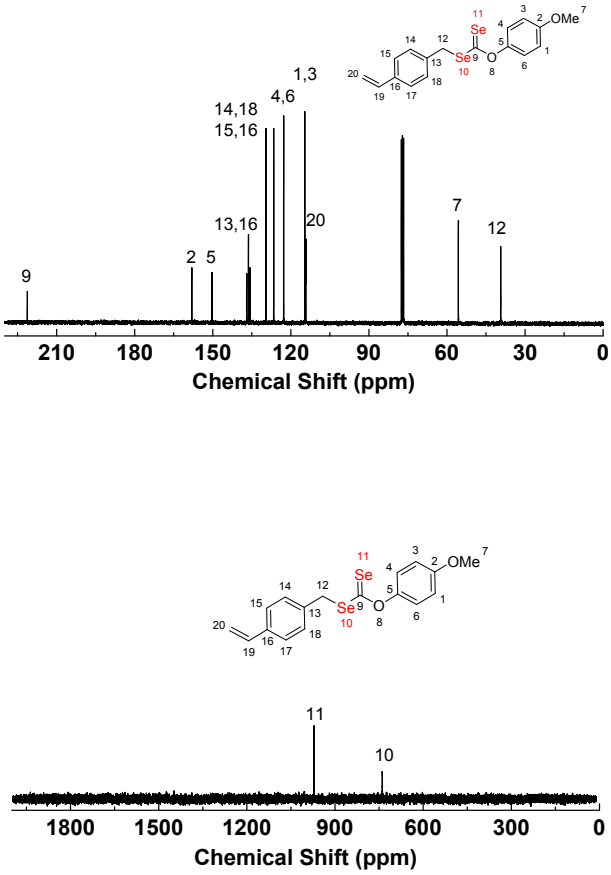

Fig. S1. ^{1}H, ^{13}C and ^{77}Se NMR spectra of O-(4-methoxyphenyl) Se-(4-vinylbenzyl) carbonodiselenoate (VBDSe).

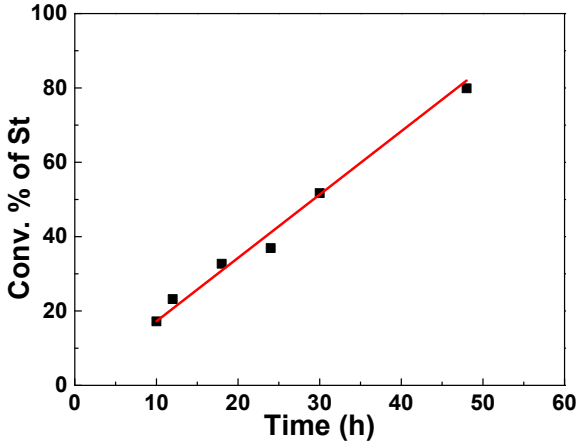

Fig. S2. Kinetic plot of Se-RAFT polymerization of St, $[St]_0$:$[VBDSe]_0$:$[AIBN]_0$ = 100:1:0.5 at 60 ˚C, $[M]_0$ + $[VBDSe]_0$ = 3 mol/L in toluene. The conversions of styrene were determined by ^{1}H NMR spectra of the crude polymerization mixture by comparing the integrated areas of characteristic signals of monomer and polymer using the following equations: C_{St} = 1-(5×$I_{5.27\text{-}5.23}$)/(3×$I_{7.43\text{-}7.12}$), where $I_{a\text{-}b}$ means the integrated areas from *a* to *b* ppm in ^{1}H NMR spectra.

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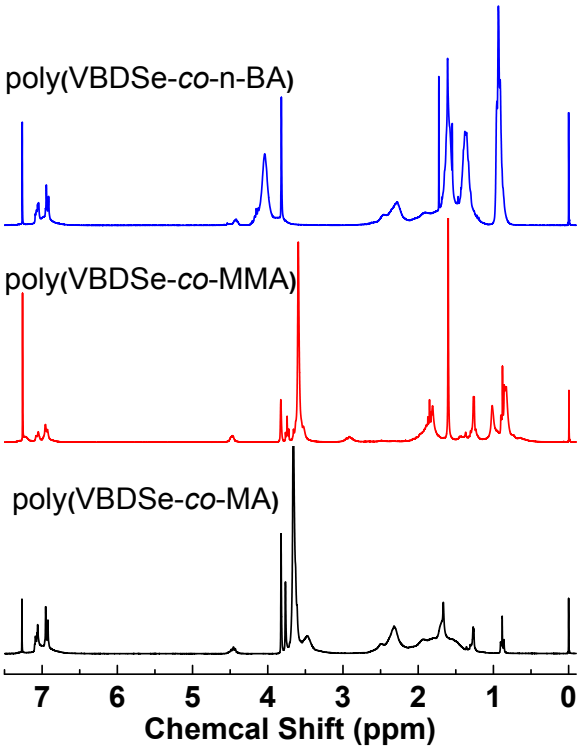

Fig. S3. ^{1}H NMR spectra of various hyperbranched copolymers obtained from Se-RAFT-SCVP ($[M]_0$:$[VBDSe]_0$ = 10:1), 24 h.

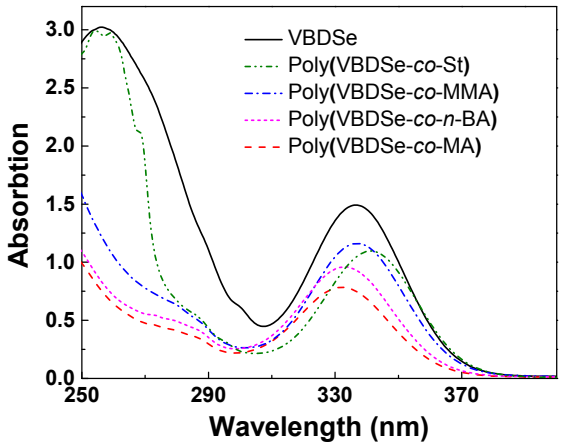

Fig. S4. UV-Vis spectra of hyperbranched copolymers, $[M_2]_0$:$[VBDSe]_0$ = 100:1, reacted for 24h. [M] = 1×10^{-4} mol /L in CH_2Cl_2.

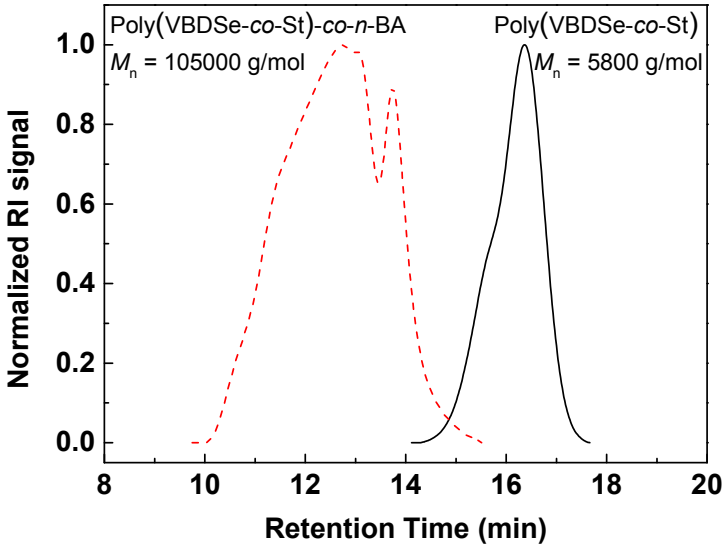

Fig. S5. SEC traces of hyperbranched poly(VBDSe-*co*-St) and poly(VBDSe-*co*-St)-*co*-*n*-BA after chain extension with *n*-BA using a feed ratio: $[n\text{-BA}]_0$:$[\text{macro-CTA}]_0$:$[\text{AIBN}]_0$ = 500:1:0.5. $[\text{BA}]_0$ + [poly(VBDSe-*co*-St]$_0$ = 3mol /L, in toluene at 60 °C for 24h, $M_{n,\ \text{macro-CTA}}$ = 5800 g/mol.

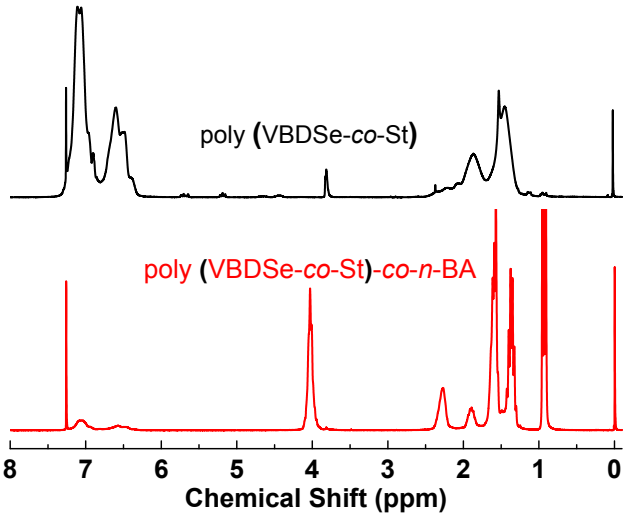

Fig. S6. ^{1}H NMR spectra of hyperbranched poly(VBDSe-*co*-St) and poly(VBDSe-*co*-St)-*co*-*n*-BA after chain extension with *n*-BA using a feed ratio: $[n\text{-BA}]_0$:$[\text{macro-CTA}]_0$:$[\text{AIBN}]_0$ = 500:1:0.5, $[n\text{-BA}]_0$ + [poly(VBDSe-*co*-St]$_0$ = 3mol /L, in toluene at 60 °C for 24h , $M_{n,\ \text{macro-CTA}}$ = 5800 g/mol.

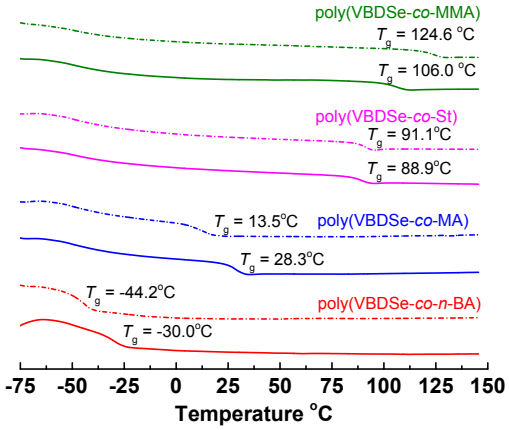

Fig. S7. DSC traces of hyperbranched copolymers synthesized by Se-RAFT-SCVP. $[M]_0$:$[VBDSe]_0$ = 10:1 (solid line) or 100:1 (dashed line).

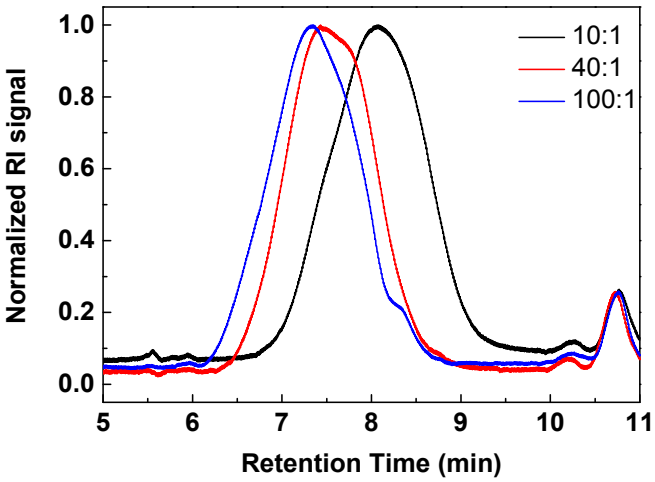

Fig. S8. SEC chromatograms of hyperbranched poly(VBDSe-*co*-NIPAM) ($[NIPAM]_0$:$[VBDSe]_0$ = 10:1, 40:1 and 100:1).

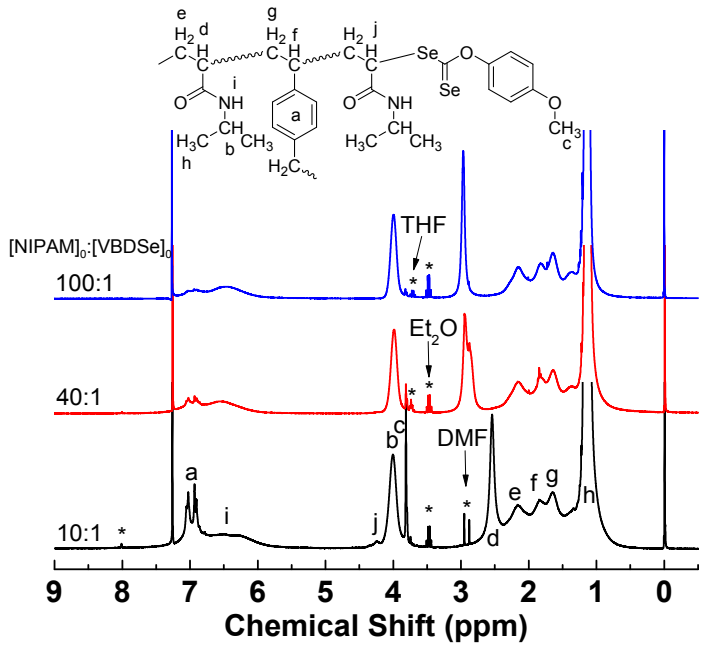

Fig. S9 ^{1}H NMR spectra of hyperbranched poly(VBDSe-*co*-NIPAM) in $CDCl_3$.

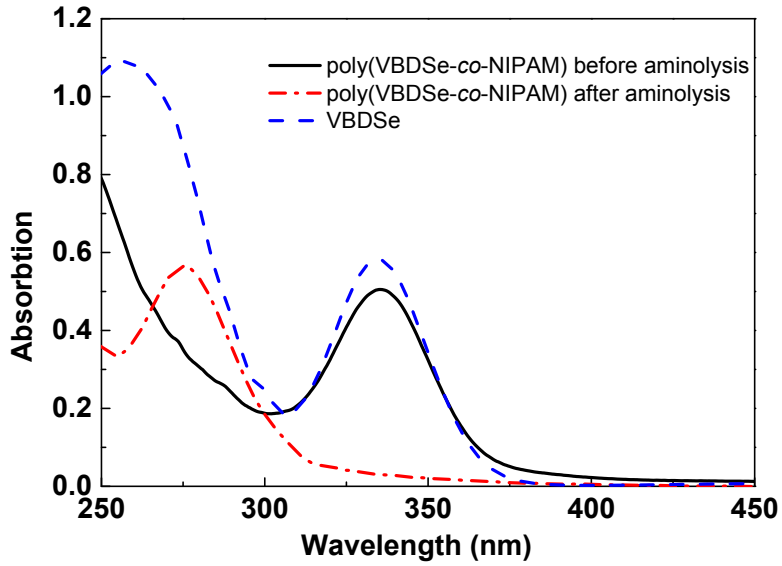

Fig. S10. UV-vis curves of VBDSe and hyperbranched copolymer before and after aminolysis in THF (1×10^{-5} mol/L) with 10 eq. *n*-hexylamine.