Electronic Supplementary Information

Self-healing of thermally molded commodity plastics based on heat-resistant and anti-aging healing systems

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(a)

(b)

Fig. S1 (a) FTIR spectrum of 2-methyl-2-adamantylmethacrylate-loaded capsules.
microcapsules in comparison with those of PMF shell and pure 2-methyl-2-adamantylmethacrylate. (b) FTIR spectrum of trimethylolpropane trimethacrylate-loaded microcapsules in comparison with those of PMF shell and pure trimethylolpropane trimethacrylate.

![Fig. S2](image)

**Fig. S2** (a) $^1$H NMR and (b) FTIR spectra of the macronitiator PMMA-Br. The numerals shown in (a) are the integrations of the peaks.
**Fig. S3** Thermal decomposition behavior of the macroinitiator PMMA-Br.

**(a)**

**(b)**

**Fig. S4** (a) $^1$H NMR and (b) FTIR spectra of the ligand Me$_6$[14]aneN$_4$. The numerals shown in (a) are the integrations of the peaks.
**Fig. S5** Thermal decomposition behavior of the ligand Me₆[14]aneN₄.

**Fig. S6** Scanning electron microscopic (SEM) photos of SiO₂ coated PS-MMA particles carrying the coordination compound of Me₆[14]aneN₄ and CuBr.

**Fig. S7** 3D distribution of healing capsules in (a) PS, (b) PMMA and (c) ABS based composites. Content of 2-methyl-2-adamantylmethacrylate-loaded microcapsules in
PS composite: 15 wt%. Contents of trimethylolpropane trimethacrylate-loaded microcapsules in PMMA and ABS composites: 15 wt%.

**Fig. S8** Photos of trimethylolpropane trimethacrylate (a, b) in liquid state at room temperature and (c, d) in solid state after being heated to 170 °C for 45 min in the presence of air. The results demonstrate that auto-polymerization must have taken place.

**Fig. S9** FTIR spectrum of PMMA-Br particles carrying the coordination compound of the ligand and cuprous bromide in comparison with those of the ligand and PMMA-Br.
Fig. S10 FTIR spectrum of silicon dioxide coated PS-MMA microparticles carrying the coordination compound of Me₆[14]aneN₄ and cuprous bromide in comparison with those of the ligand and silicon dioxide coated PS-MMA microparticles.