

Supplementary Materials for

Bismaleimide Bridged Silsesquioxane Aerogel with Excellent Heat

Resistance: Effect of Sol-Gel Solvent Polarity

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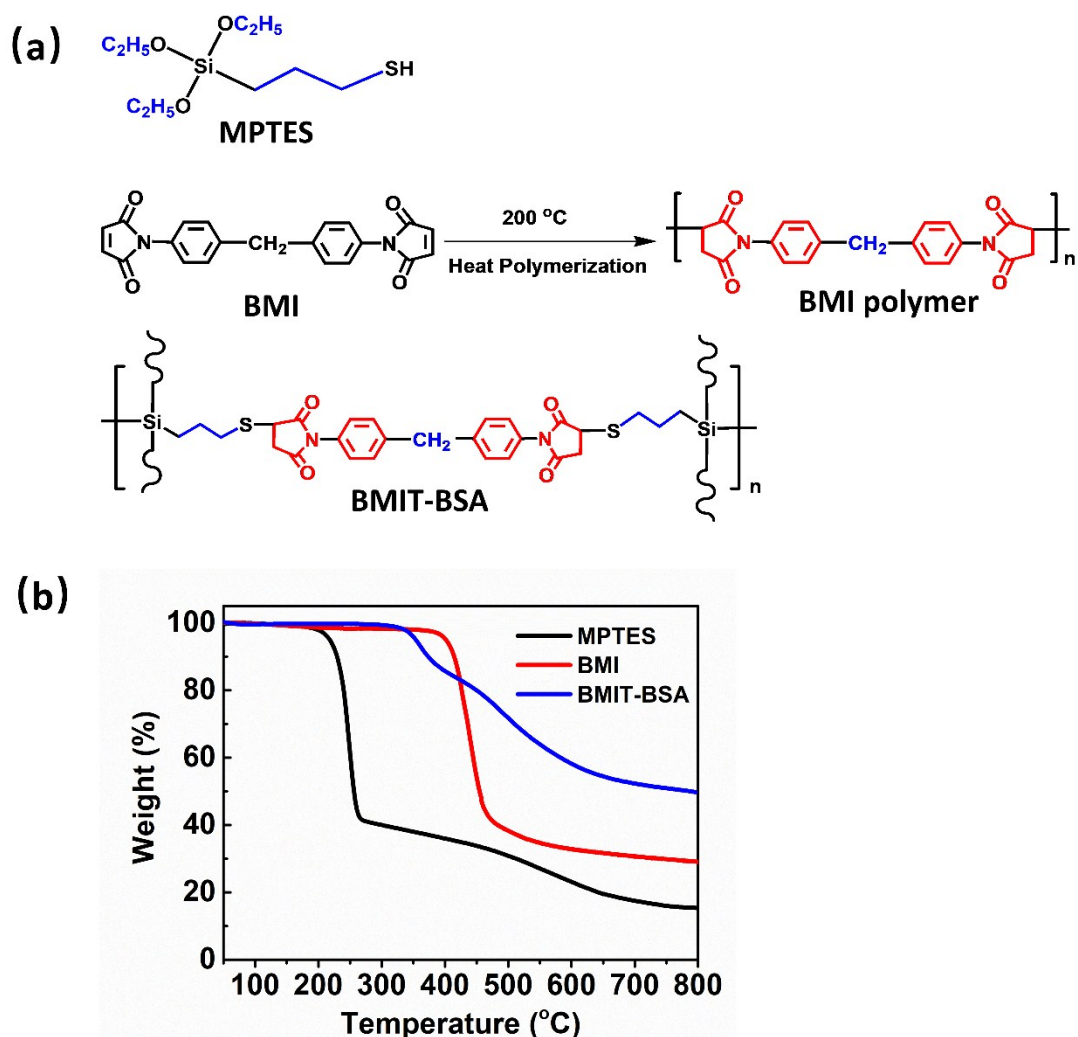


Fig. S1 (a) Chemical structure of (3-mercaptopropyl) triethoxysilane (MPTES), N, N'-(4, 4'-diphenylmethylene) bismaleimide (BMI), BMI polymer and BMIT-BSA. (b) TG curves of MPTES, BMI and BMIT-BSA.

As shown in Fig. S1, (3-mercaptopropyl) triethoxysilane (MPTES) was initially decomposed at 210°C, due to thermally unstable aliphatic chain (Fig. S1a, colored in blue) in its structure ^[1]. When heating BMI from room temperature to 800 °C, BMI would be self-polymerized at about 200 °C and transformed into BMI ^[2]. The initial thermal decomposition of BMI was 400°C due to the existence of benzene ring and imide ring (Fig. S1a, colored in red) ^[3]. Thus, when bismaleimide structure was introduced into BMIT-BSAs, the polymeric network contains aliphatic chains (Fig. S1a, colored in blue), benzene rings and imide rings (Fig. S1a, colored in red). Although the aliphatic groups would shift the initial decomposition temperature (T_{di}) to low temperature, the rigid benzene ring and imide ring with higher steric hindrance and thermal stability would realize a higher T_{di} ^[4]. Owing to the combination of bismaleimide segments and aliphatic chains, BMIT-BSA was initially decomposed at 336 °C, demonstrating good thermal stability.

References

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