Supplementary Information

Preparation of a low dielectric POSS/epoxy hybrid polymer without sacrificing the mechanical performance

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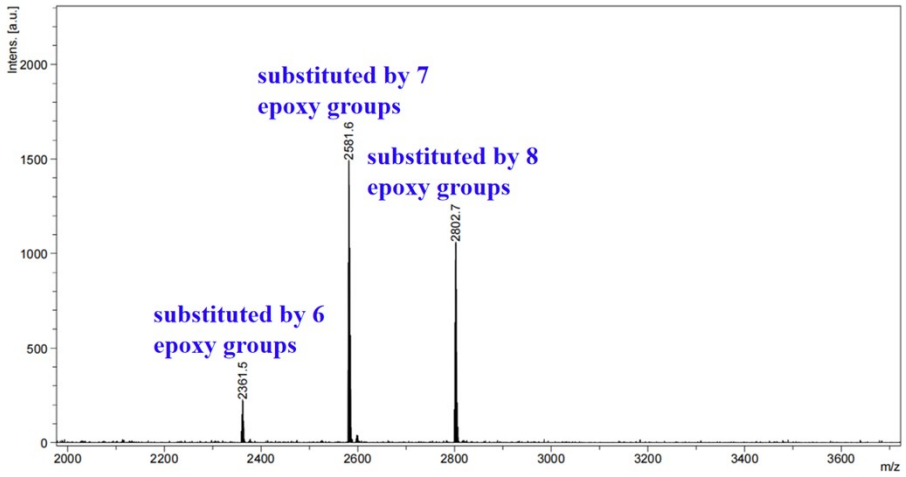

Fig. S1. MALDI-TOF-MS spectra of SHEP.

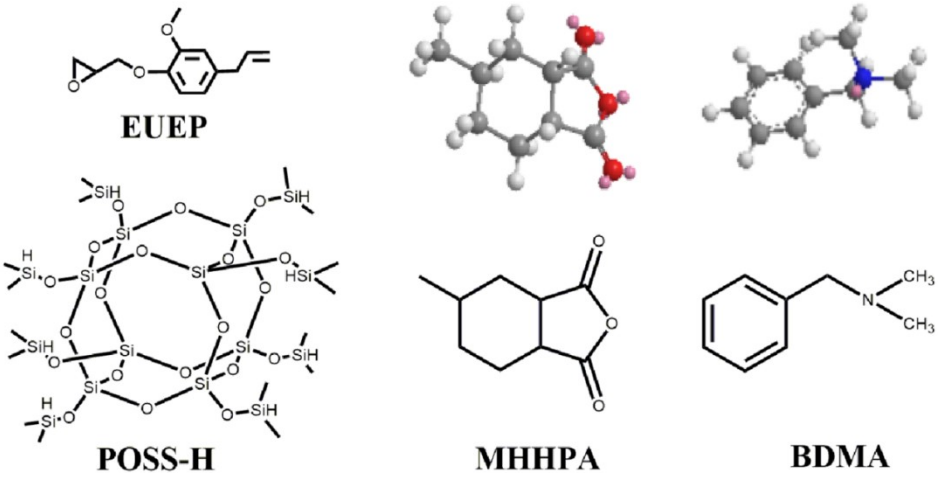

Fig. S2. Structures of the main chemicals.

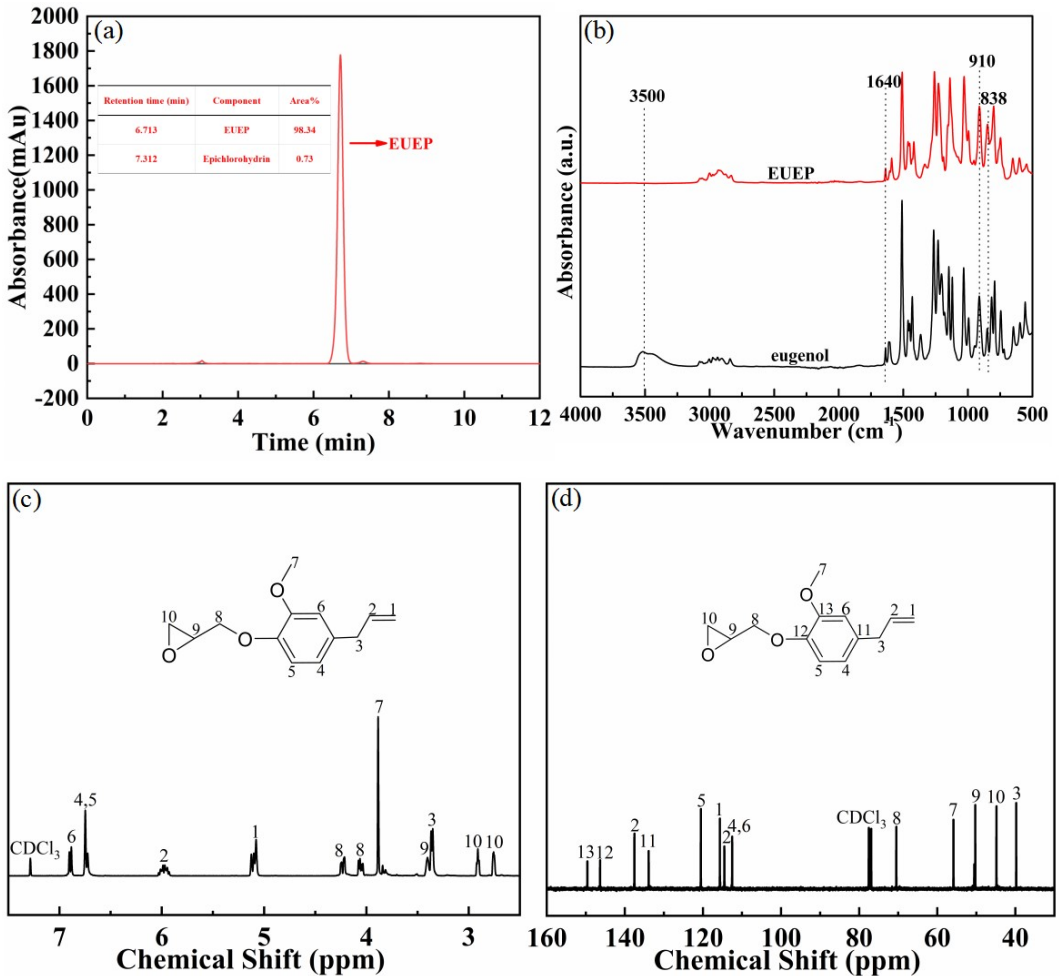

Fig. S3. (a) HPLC spectrum of product after epoxidation reaction of eugenol; (b) FTIR spectra of eugenol and EUEP; (c) ^{1}H-NMR and (d) ^{13}C-NMR spectra of EUEP.

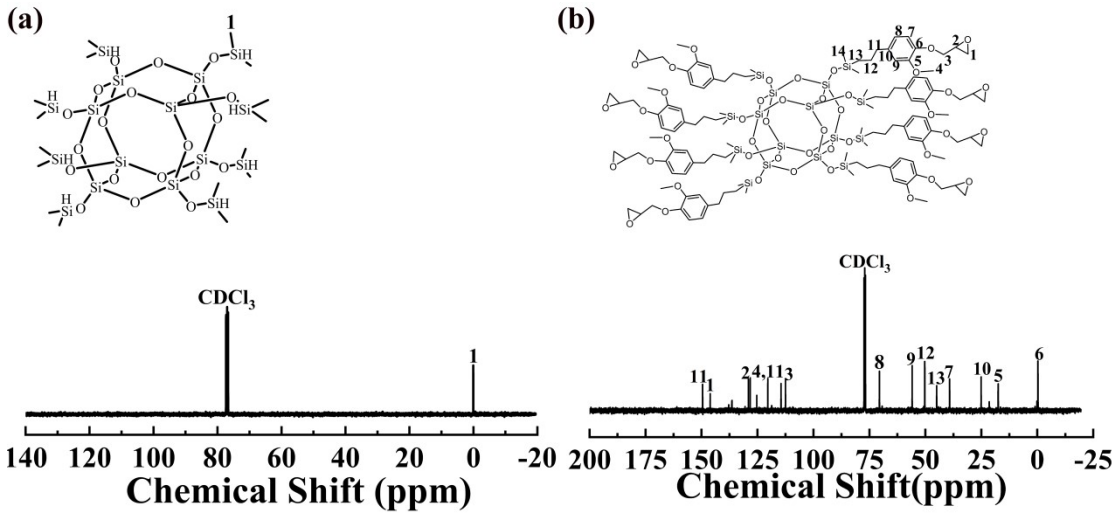

Fig. S4. ^{13}C-NMR spectra of (a) POSS-H and (b) SHEP samples.

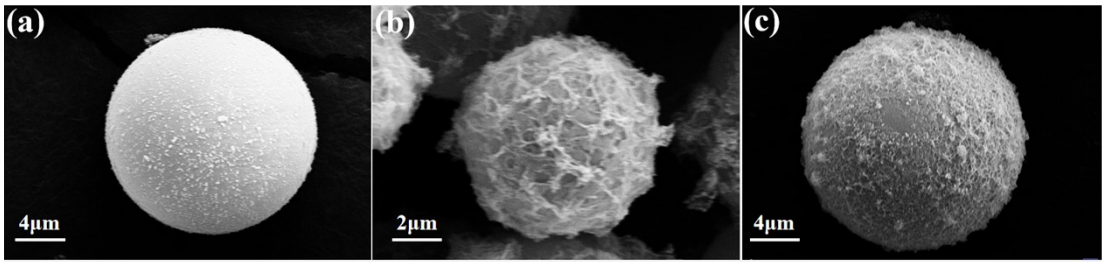

Fig. S5. SEM images of the (a) original S4630, modified S4630: (b) non-ultrasonic treatment and (c) ultrasonic treatment.

Fig. S5 displays the SEM images without ultrasonic treatment of the S4630-KBM603. Compared to the ultrasonic treatment process, a large amount of KBM603 is grafted onto the surface of S4630-KBM603, and agglomeration even occurs without ultrasonic treatment. After the ultrasonic treatment, the grafting amount of KBM603 on the surface of S4630-KBM603 is decreased and is homogeneously distributed.

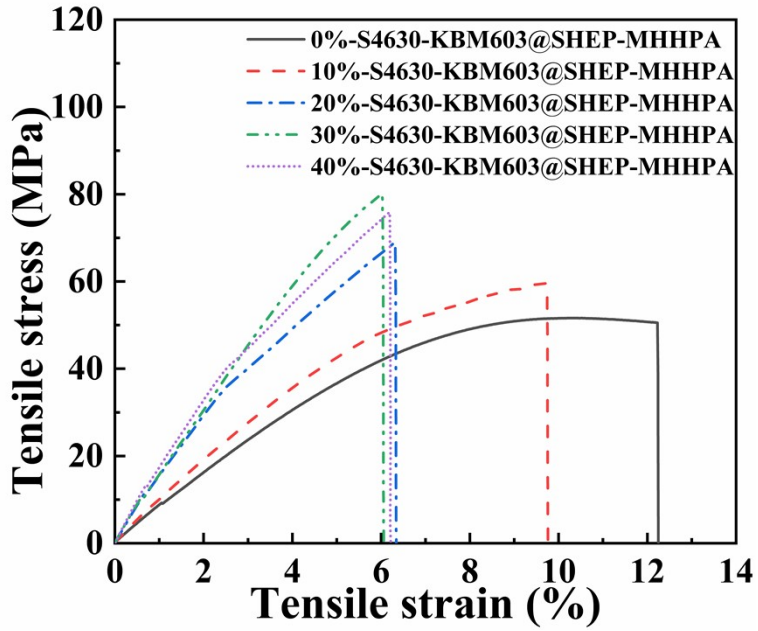

Fig. S6. Stress-strain curves of *x*%-S4630-KBM603@SHEP-MHHPA.

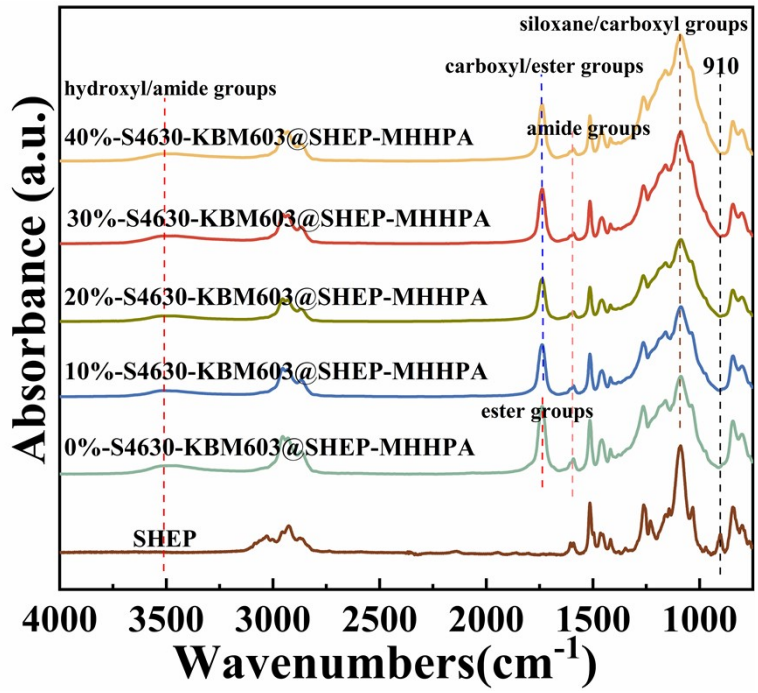

Fig. S7. FTIR spectra (epoxy before and after curing).

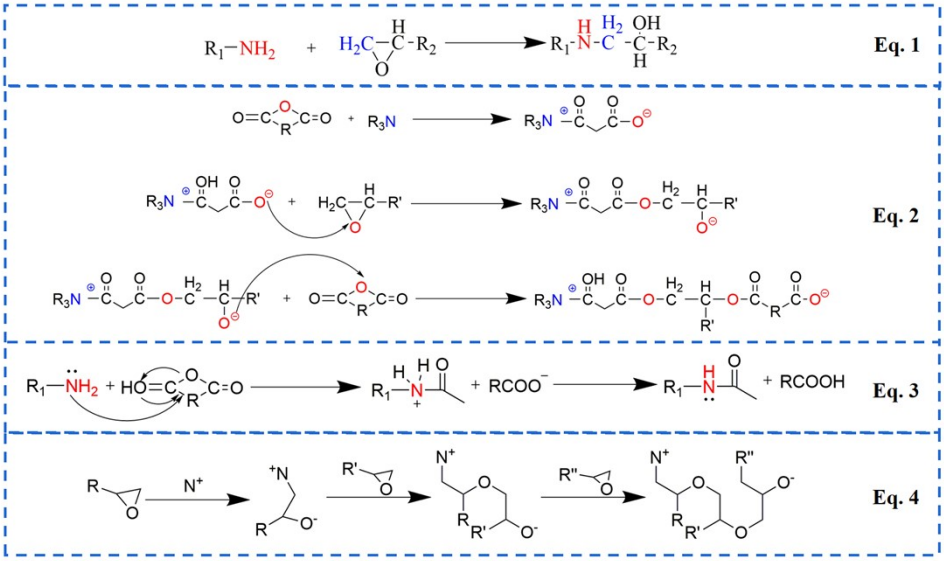

Fig. S8. Reaction mechanism diagram among epoxy groups, anhydride groups and amino groups.

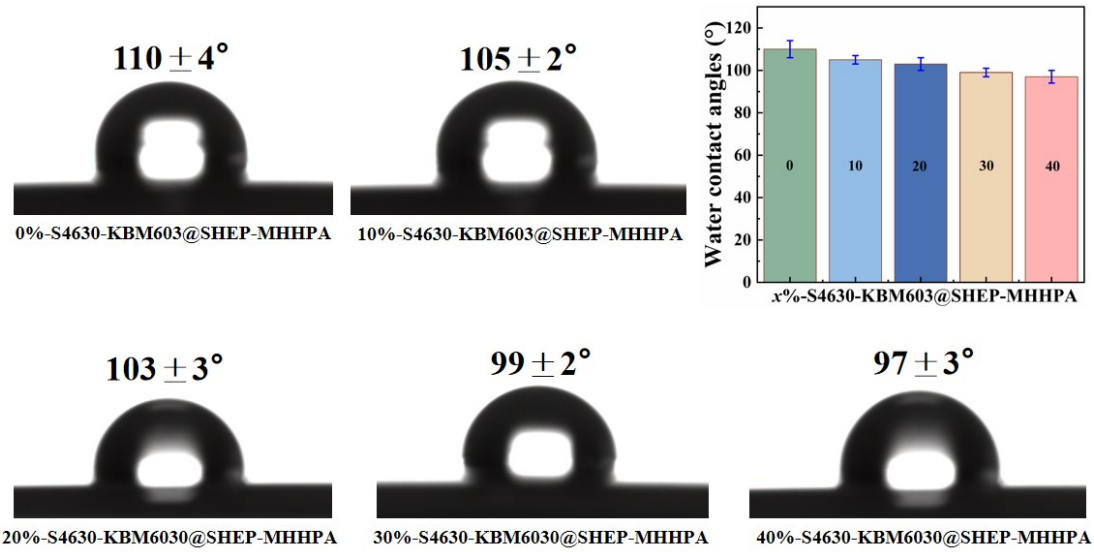

Fig. S9. Water contact angle images of *x*%-S4630-KBM603@SHEP-MHHPA.

Table S1. Recipes of curing systems for x%-S4630-KBM603@SHEP-MHHPA

Systems	SHEP (g)	S4630-KBM603 (g)	MHHPA (g)	BDMA (g)
0%-S4630-KBM603@SHEP-MHHPA	10.00	0.00	4.64	0.10
10%-S4630-KBM603@SHEP-MHHPA	10.00	1.00	4.64	0.10
20%-S4630-KBM603@SHEP-MHHPA	10.00	2.00	4.64	0.10
30%-S4630-KBM603@SHEP-MHHPA	10.00	3.00	4.64	0.10
40%-S4630-KBM603@SHEP-MHHPA	10.00	4.00	4.64	0.10

Table S2. Average distance of the cured molecular chains.

Samples	2θ(°)	d(Å)
POSS-H	7.86	11.23
x%-S4630-KBM603@SHEP-MHHPA	7.86	11.23