Electronic Supplementary Material (ESI) for RSC Advances.

Electronic Supplementary Information

Significantly improving mechanical, thermal and dielectric properties of cyanate ester resin through building new crosslinked network with unique polysiloxane@polyimide core-shell microsphere

Xinyi Dong, Li Yuan, Guozheng Liang,* and Aijuan Gu*

Jiangsu Key Laboratory of Advanced Functional Polymer Design and Application

Department of Materials Science and Engineering

College of Chemistry, Chemical Engineering and Materials Science

Soochow University, Suzhou 215123, China

*To whom all correspondence should be addressed

Tel: +86 512 65880967

Fax: +86 512 65880089

Email: lgzheng@suda.edu.cn (Guozheng Liang), ajgu@suda.edu.cn (Aijuan Gu),

Table S1 Typical toughened TR systems in literature [a)]

System [b)]	Filler content (%)	Impact strength (kJ/m^2)	Fracture toughness (MPam$^{1/2}$)	T_g (^{o}C)	Storage modulus (GPa) [c)]	Flexural/ tensile modulus (GPa)	Reference
PSi@EP/EP	0	------	0.7	148	2.6	3.19	S1
	10	------	1.31	147	2	1.96	
PSi@EP/EP	0	22.5	2.17	60	25	0.88	S2
	5	55.8	2.81	58	16	0.79	
cPES/CE	0	17	------	298	------	2.53	S3
	10	24	------	290	------	2.85	
HBPSiEP/CE	0	9	------	295	------	------	S4
	30	23	------	271	------	------	
EPMPS/CE	0	6.1	------	287	------	------	S5
	15	17.8	------	275	------	------	
CRBN/CE	0	4.4	------	-----	------	52	S6
	8	13.5	------	------	------	48	
PSi@PI/CE	0	15.5	0.51	278	1.93	2.47	This work
	2	28.0	0.88	281	1.97	2.60	

a) The data contain best comprehensive properties and the properties of pure resins; symbol "------" means the data are not mentioned in paper.

b) PSi@EP: Polysiloxane@epoxy core-shell microsphere;
EP: Epoxy resin;
cPES: Phenolphthalein type polyarylether sulfone;
CE: Cyanate ester;
HBPSIEP: Consisting of hyperbranched polysiloxane and epoxy resin;
EPMPS: Epoxidized methyl phenyl silicone resin;
CRBN: Carboxyl-randomized liquid butadiene-acrylonitrile rubber

c) The storage modulus at 50 ^{o}C.

References

[S1] J. Chen, A. J. Kinloch, S. Sprenger and A. C. Taylor, *Polymer*, 2013, **54**, 4276.

[S2] P. K. Roy, N. Iqbal, D. Kumar and C. Rajagopal, *J. Polym. Res.*, 2014, **21**, 1.

[S3] L. Zhao, L. Yuan, G. Z. Liang and A. J. Gu, *RSC Adv.*, 2015, **5**, 58989.

[S4] C. Zhou, A. J. Gu, G. Z. Liang and L. Yuan, *Polym. Adv. Technol.*, 2011, **22**, 710.

[S5] S. K. Dai, A. J. Gu, G. Z. Liang and L. Yuan, *Polym. Adv. Technol.*, 2011, **22**, 262.

[S6] M. F. Zeng, X. D. Sun, X. Dong. Yao, Y. Wang, M. Z. Zhang and B. Y. Wang, *J. Mater. Sci.*, 2009, **44**, 4270.