

Supporting Information

Lightweight polybenzoxazole aerogels with high compressive strength, ultralow dielectric constants, and excellent thermal stability

Yi Zhang, Xiaoyun Liu*, Rui Yang, Qixin Zhuang*

Laboratory of Specially Functional Polymeric Materials and Related Technology (ECUST), Ministry of Education, East China University of Science and Technology, Shanghai, 200237, China

*Corresponding Author: Xiaoyun Liu. Email: liuxiaoyun@ecust.edu.cn; Qixin Zhuang. Email: qxzhuang@ecust.edu.cn

Synthesis procedures

BAP-HA

Add 500 ml NMP and 12.5g LiCl to a 1L four-port flask and stir at -10 °C, N₂ for 30 min. Then 0.1 mol BAP and 15 ml propylene oxide were added into the flask, and 0.1 mol TPC monomer was added into the flask after the monomer in the flask was completely dissolved. The whole reaction system was placed at -10 °C for 1h and then at room temperature for 20h. When the reaction is completely completed, water is washed to form white solid precipitation, filtration, vacuum drying to obtain white products.

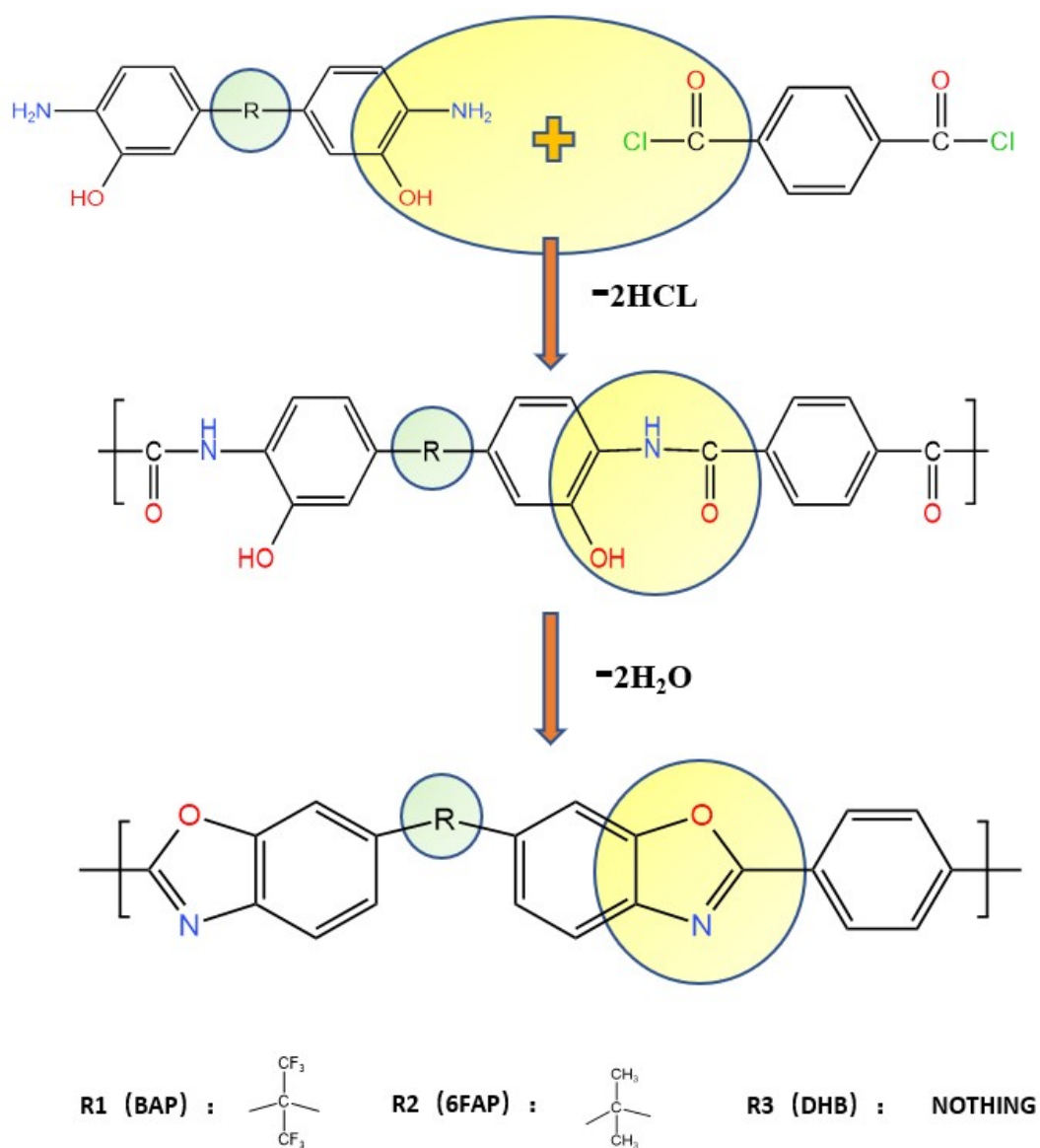
6FAP-HA

500 ml of NMP and 12.5 g of LiCl, 0.1 mol of 6FAP and 15 ml of propylene oxide were completely dissolved, and 0.1 mol of TPC monomer was added into the flask. The preparation method was similar to that of BAP.

DHB-HA

500 ml of DMAc and 12.5 g of LiCl, 0.1 mol of DHB and 15 ml of propylene

oxide, 0.1 mol of TPC monomer, the whole reaction system was placed at -2 °C for 1h, and then at room temperature for 20 h.



Scheme S1 Synthesis route of resins

Table S1 Elemental analysis of aerogels

	C/%	N/%	O/%	F/%
BAP-HA	77.87	7.25	14.88	
BAP	83.93	7.4	8.66	
6FAP-HA	65.63	5.43	11.93	17.01
6FAP	71.67	4.42	11.2	12.71

DHB-HA	64.93	4.57	30.49
DHB	66.97	5.72	27.31

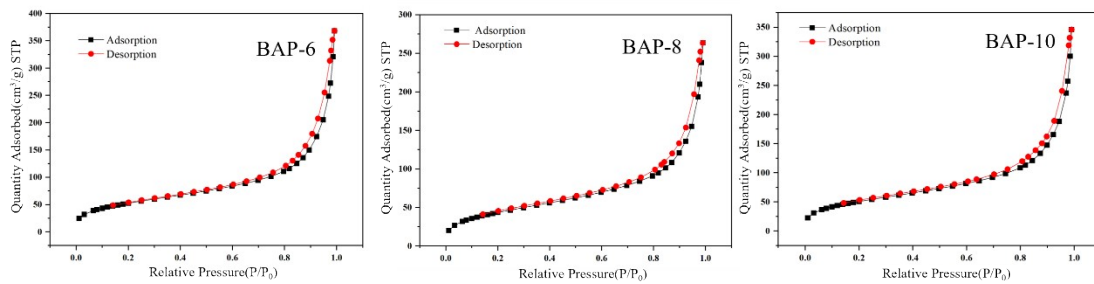


Figure S1 N₂ Adsorption and Desorption curve of BAP aerogels at different mass fraction

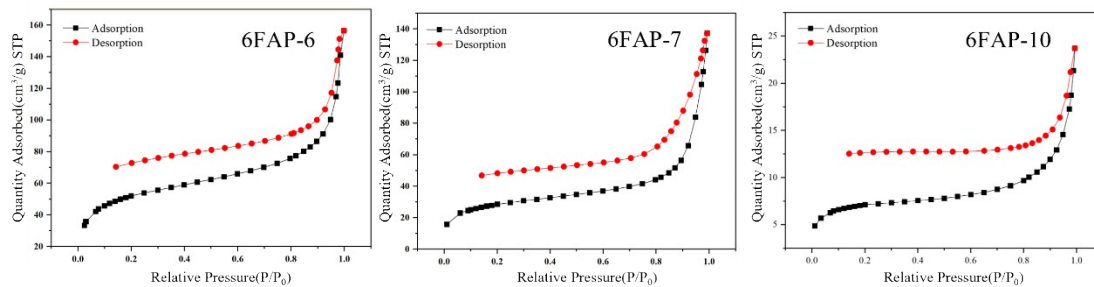


Figure S2 N₂ Adsorption and Desorption curve of 6FAP aerogels at different mass fraction

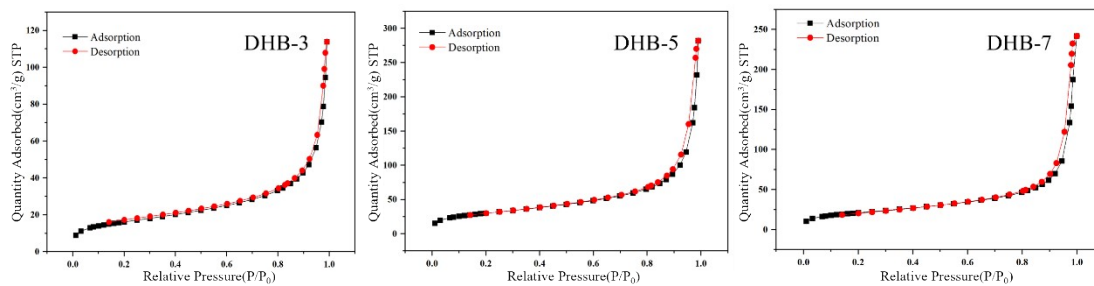


Figure S3 N₂ Adsorption and Desorption curve of DHB aerogels at different mass fraction

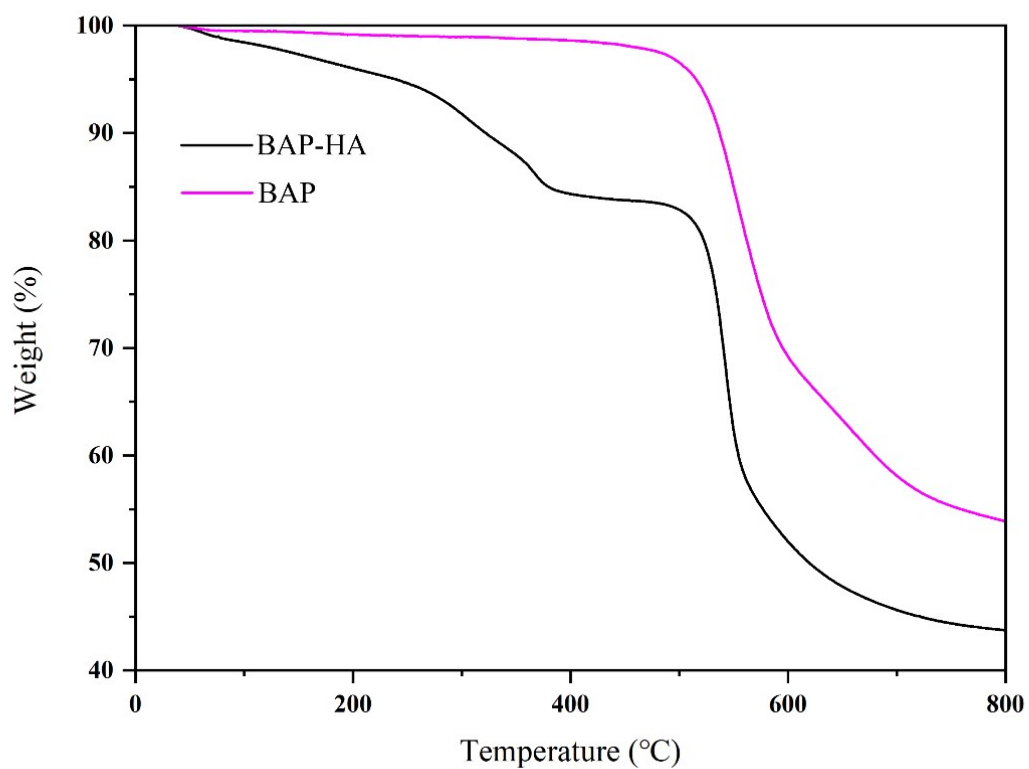


Figure S4 TG curves of BAP and BAP-HA aerogels

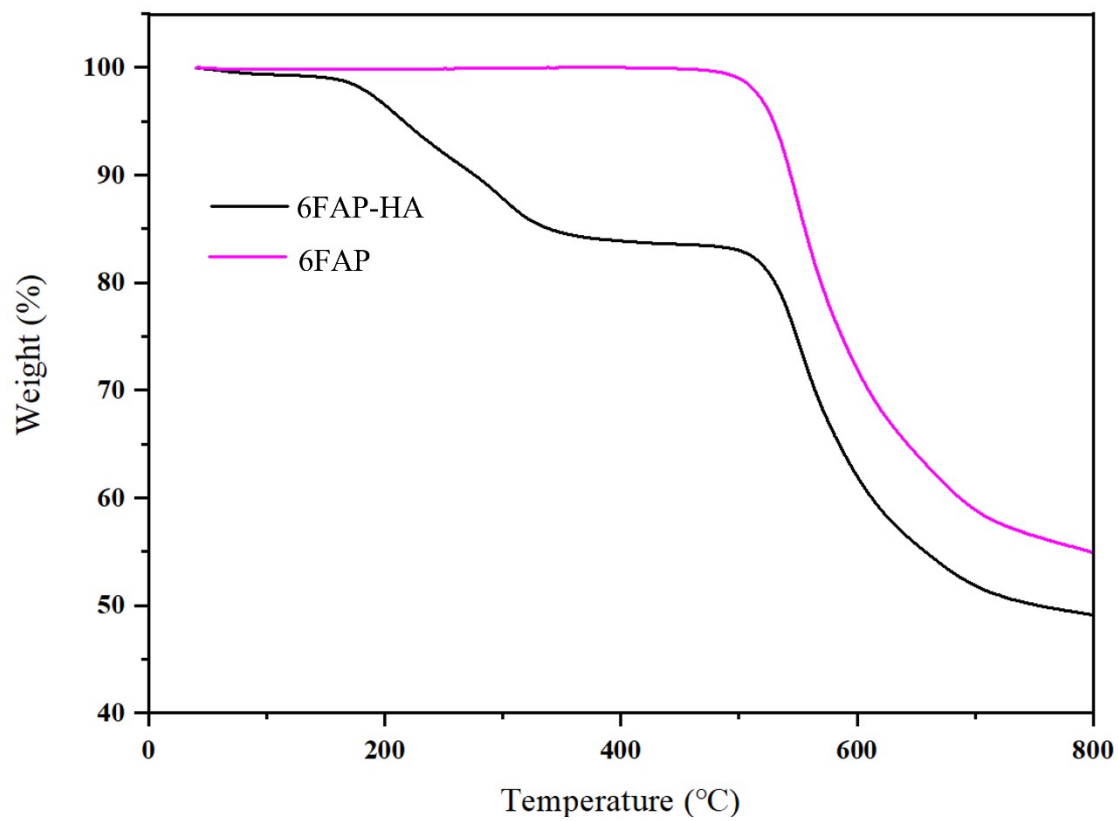


Figure S5 TGA curves of 6FAP and 6FAP -HA aerogels

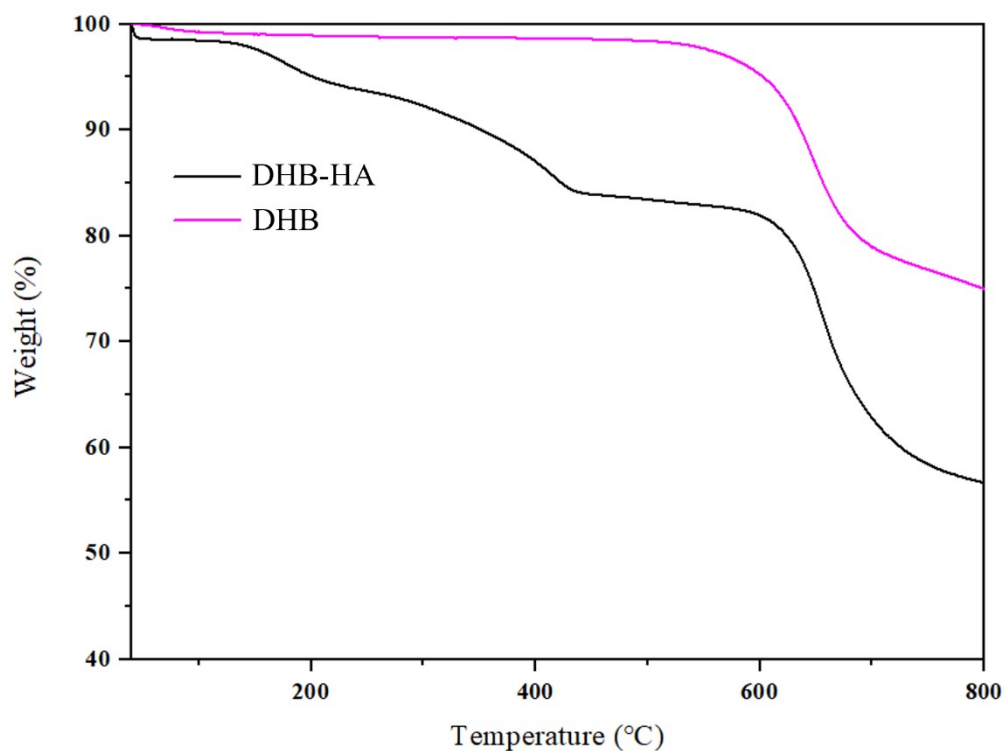


Figure S6 TGA curves of DHB and DHB-HA aerogels

Table S2 Porosity of aerogels with different mass fractions

	Mass Fraction of polymer in aerogel (%)							
	3	4	5	6	7	8	9	10
BAP	/	/	/	88.5	87.9	85.4	84.2	81.3
6FAP	/	/	/	91.3	89.2	88.1	85.6	82.2
DHB	88.5	89.8	88.7	86	77.5			