Electronic Supplementary Material (ESI) for Soft Matter.

Electronic Supplementary Information

Ultra-durable Icephobic Coating by Molecular pulley

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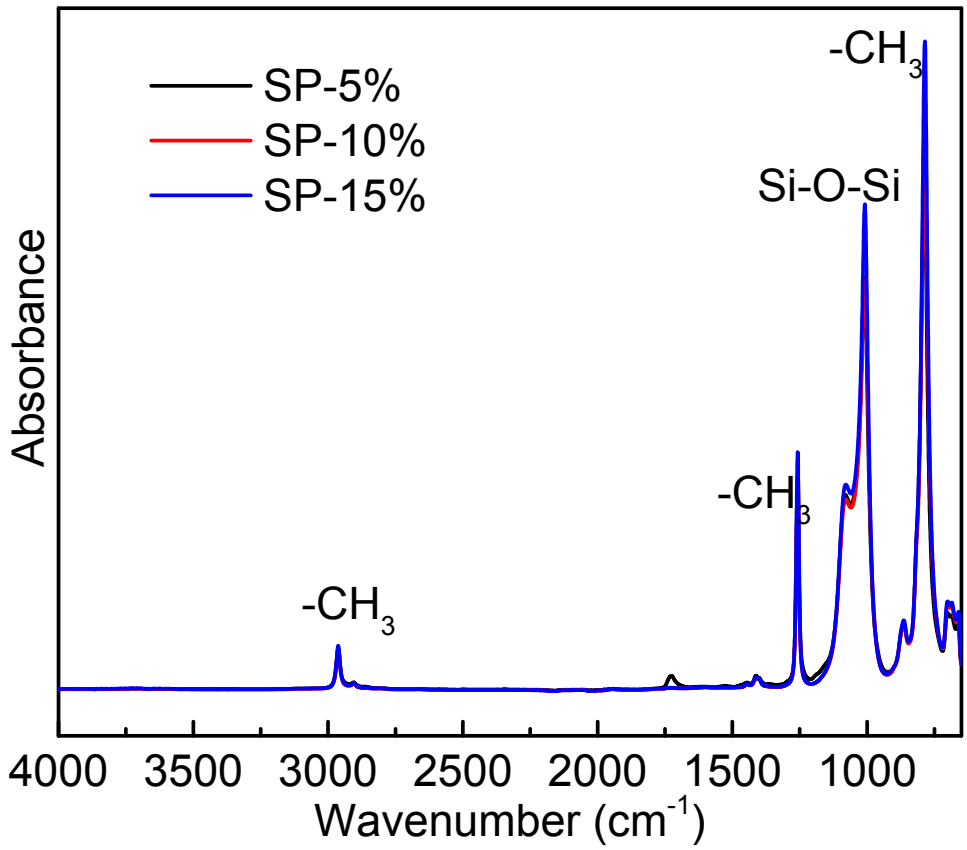

Fig. S1 ATR-FTIR spectra of SP. The signal at around 2963 cm^{-1} corresponds to the stretching vibration of $–CH_3$, while the signal at around 1256 cm^{-1} and 786 cm^{-1} are attributed to the bending vibration of $–CH_3$. The signal at around 1081 cm^{-1} and 1009 cm^{-1} are the result of vibration of Si-O-Si. Since the content of polyrotaxane crosslinker is too low, there is no obvious signal from the groups of polyrotaxane.

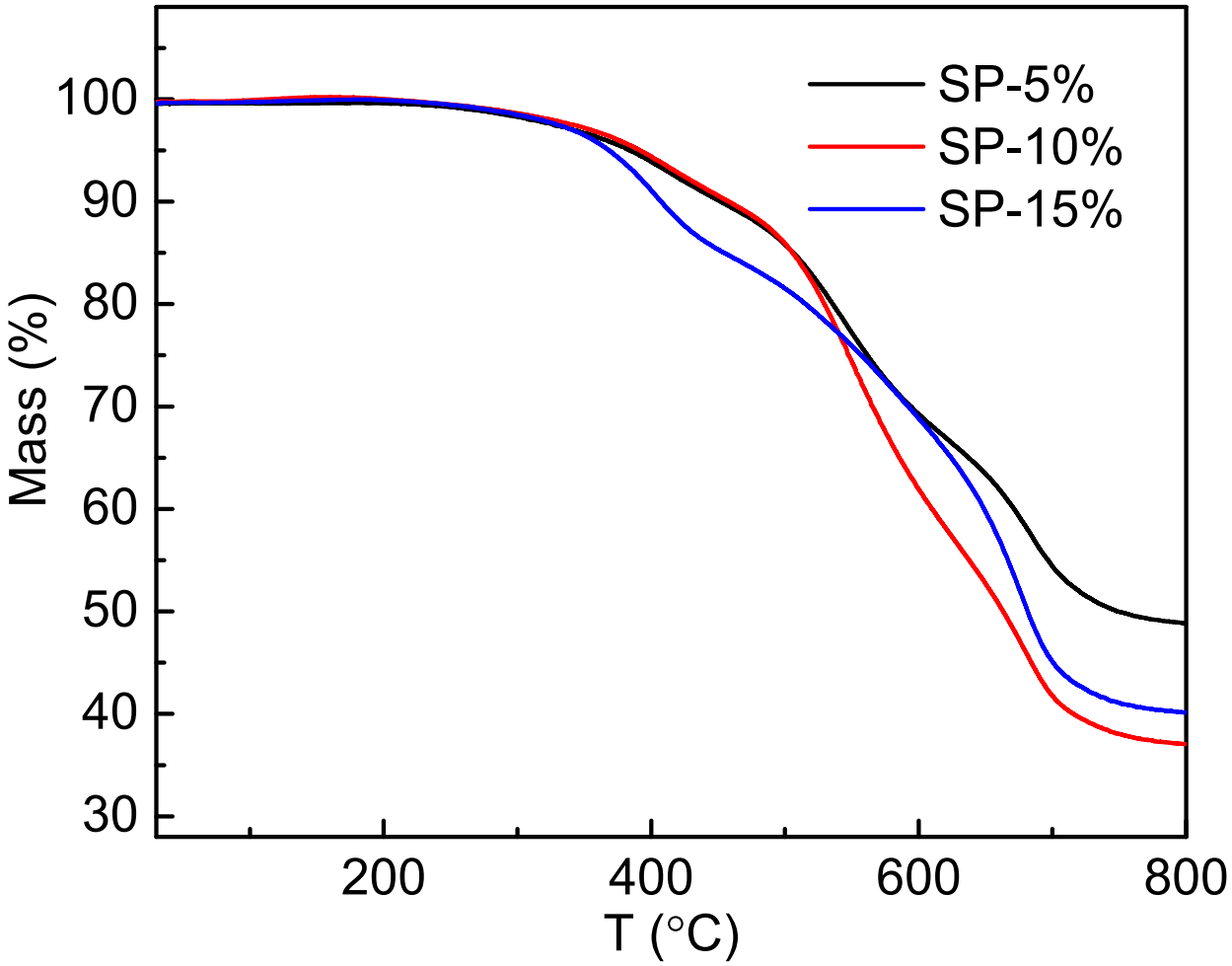

Fig. S2 Thermalgravimetric analysis shows that the temperature at 5% weight loss for SP-5%, SP-10%, and SP-15% is 383, 390, and 368 °C respectively, meaning that the prepared materials show excellent thermal stability.

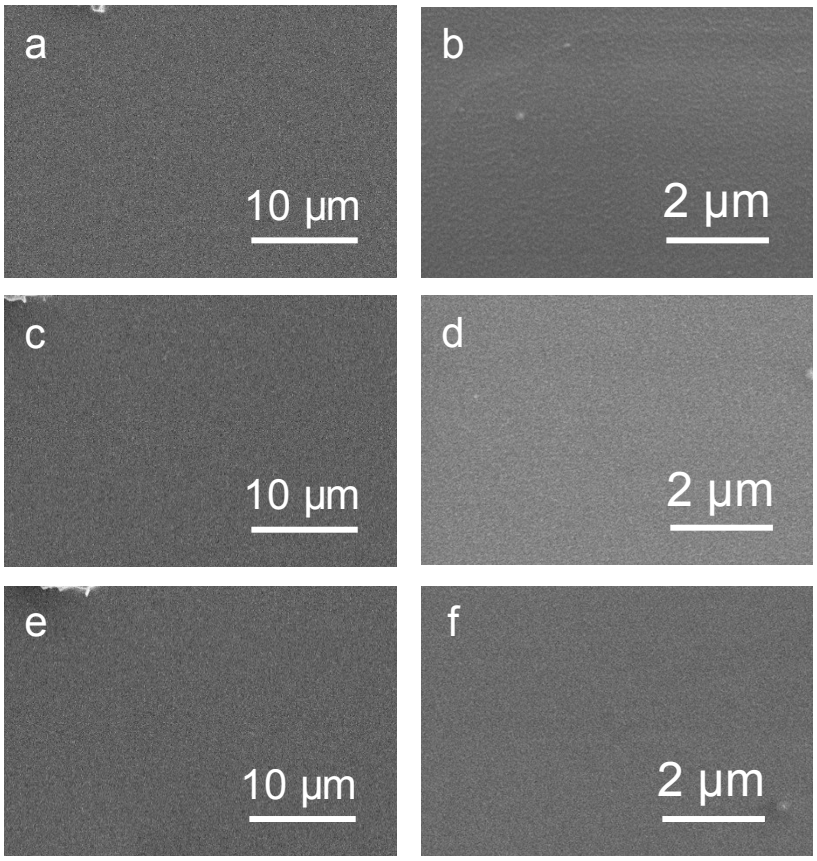

Fig. S3 SEM images of (a, b) SP-5%, (c, d) SP-10%, and (e, f) SP-15%. All of the coatings are homogeneous, smooth and intact.

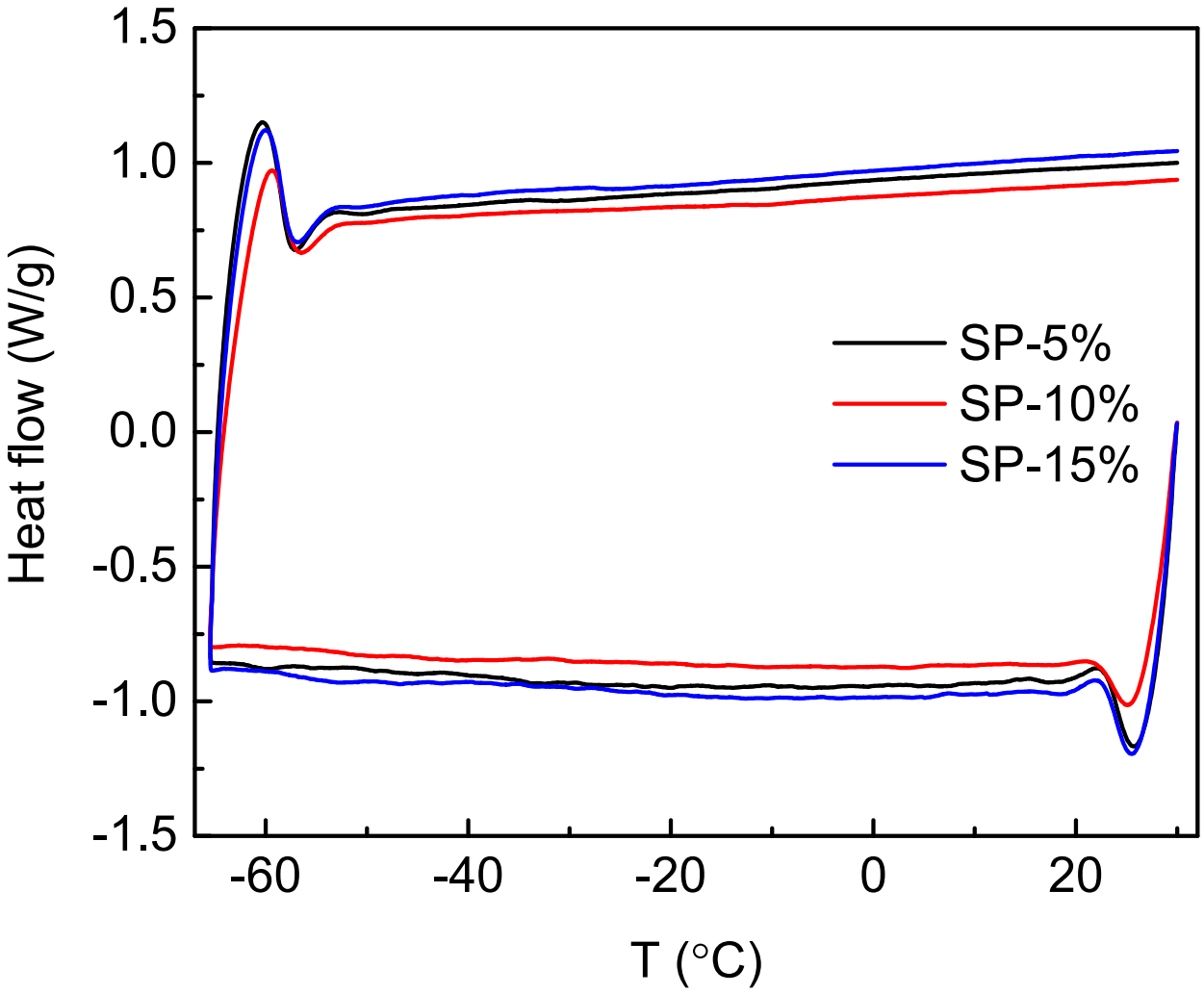

Fig. S4 DSC shows that there is no signal of glass transition temperature from -65 °C to 30 °C.

1. Zhuo, Y.; Håkonsen, V.; He, Z.; Xiao, S.; He, J.; Zhang, Z., Enhancing the Mechanical Durability of Icephobic Surfaces by Introducing Autonomous Self-Healing Function. *ACS applied materials & interfaces* **2018,** *10* (14), 11972-11978.