Supporting information:



Fig. S1 The detailed process for the synthesis of the hydrophobic silica aerogel. For the first step, tetraethoxysilane (TEOS) was used as the precursor of the silica sol and hydrochloric acid (HCl) was added as acid catalyst to accelerate the hydrolysis reaction. After the homogeneous mixing of solvent ethanol (EtOH), tetraethoxysilane (TEOS), hydrochloric acid (HCl), and distilled water, the mixed solution undergo a reflow process at 85°C for 8h to produce the partially condensed silica sol (CS). In the second step, ammonium was treat as the basic catalyst to accelerate the condensation reaction of the sol and make the sole finish the gelation process. The obtained alcogel was socked in hexamethyldisiloxane (HMDO) at 50°C for 8h to finish the first solvent exchange and then modified by trimethylchlorosilane (TMCS) for 24h at ambient. After the second solvent exchange, the gels dried continuously at 60 °C for 12h under the ambient pressure.



Fig. S2 Water contact angle test on the obtained samples and the detailed content of the absorbed water show in the TGA curves. a) is the pure PI aerogel; e) is the silica aerogel powders; b), c), and d) are the PI/SAp composite aerogels PI/SAp-20, PI/SAp-50, and PI/SAp-80; f) is the amplified TGA curves which illustrated the weight loss at 100 °C. This value corresponding to the absorbed water, to a large extent, indicate the water resistance of the samples.



Fig. S3 SEM images at two different magnifications of all the obtained samples.



Fig. S4 TG-DSC curves of the all the obtained samples. a) is the pure PI aerogel (PI/SAp-0); e) is the silica aerogel powders(PI/SAp-100); b), c), and d) are the PI/SAp composite aerogels PI/SAp-20, PI/SAp-50, and PI/SAp-80;