Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

Hierarchically Featured and Substrate Independent Bulk-Deposition of 'Reactive' Polymeric Nanocomplex in Controlled and Strategic Manipulation of Durable Biomimicked Wettability

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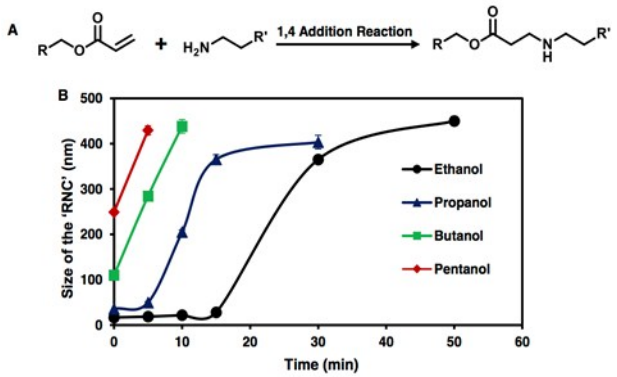

Fig. S1 A) Schematic representation of 1,4 Michael addition reaction between primary amine and acrylate group. B) Dynamic light scattering (DLS) plot of 5-Acl/BPEI mixture in pentanol (red line), butanol (green line), propanol (blue line) and ethanol (black line). This study indicating the rapid growth of nanocomplex in pentanol compare to its lower analogues.

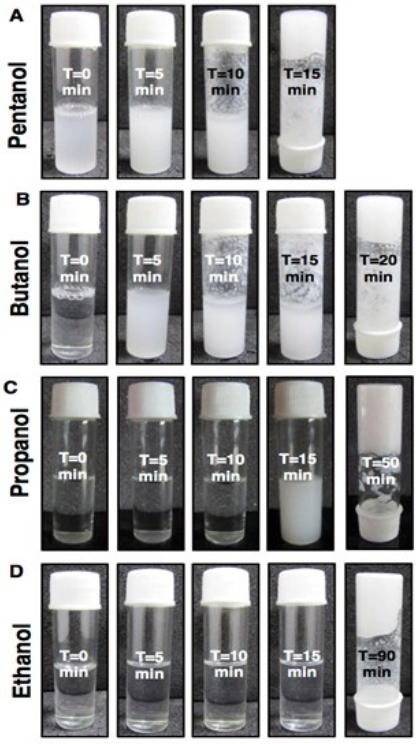

Fig. S2 A-D) Digital images illustrating the gelation of same reaction mixtures of BPEI/5Acl in different alcoholic solvents including pentanol (A).

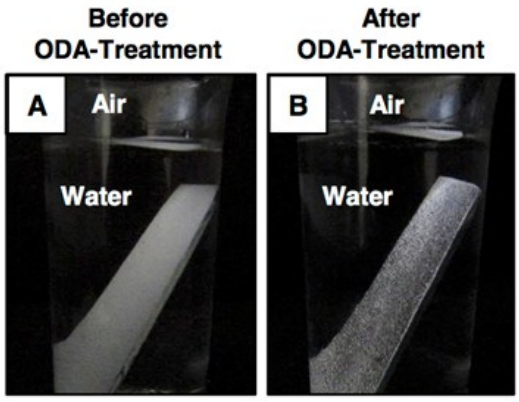

Fig. S3 A-B) Digital images of polymeric coating under water before (A) and after (B) covalent modification with octadecylamine (ODA). After covalent modification with ODA, the shiny interface of water/polymeric coating revealed the presence of metastable trapped air.

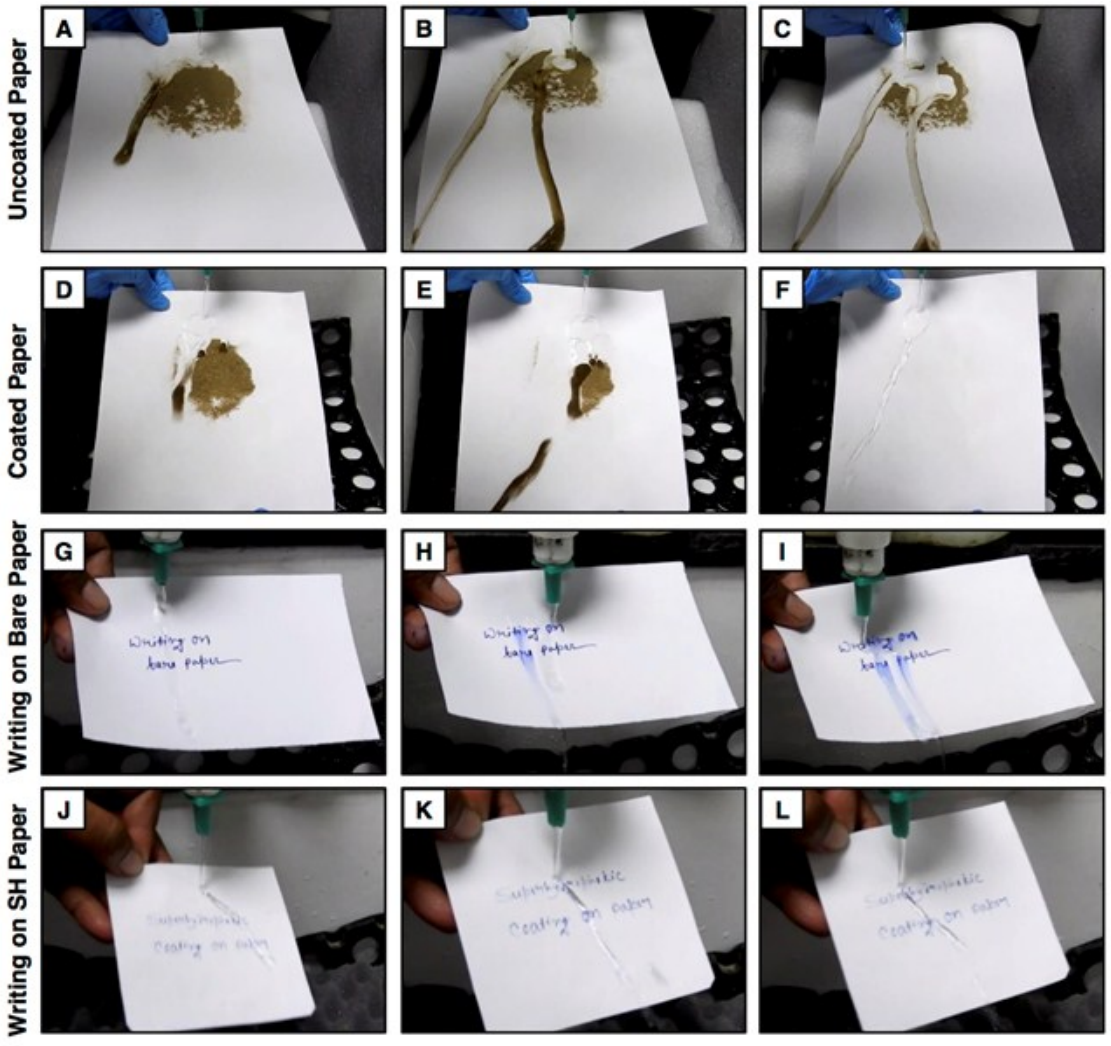

Fig. S4 A-F) Digital images illustrating the self-cleaning performance of deposited dust on uncoated (A-C) and superhydrophobic (D-F) printed paper (A-4 sized). G-L) Digital images showing the effect of exposures of manual write up to water stream, the write up on uncoated paper (G) was significantly damaged (H-I) with random spilling and spreading of ink, whereas no such spilling and spreading of ink was noted on superhydrophobic paper (J-L) under the stream of water.

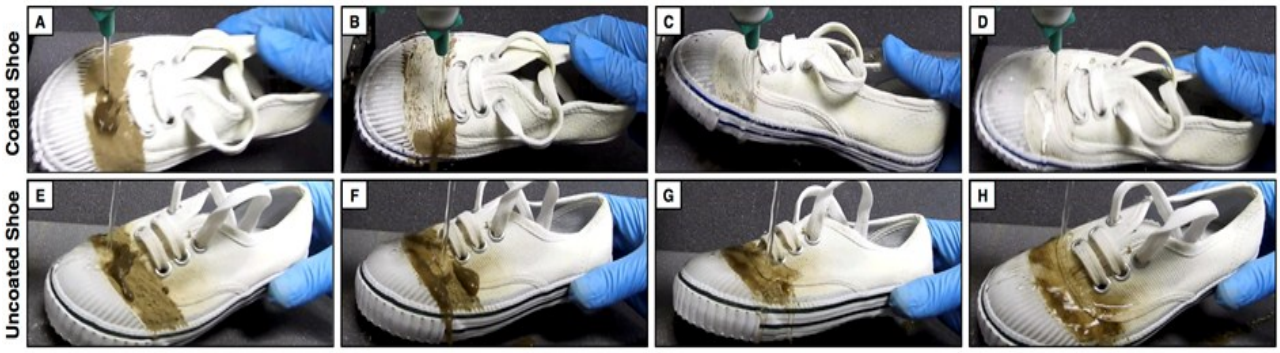

Fig. S5 Figure S5: A-H) Digital images illustrating the self-cleaning performance of the deposited dust on the superhydrophobic shoe (A-D) and uncoated shoe (E-H) under the stream of water.

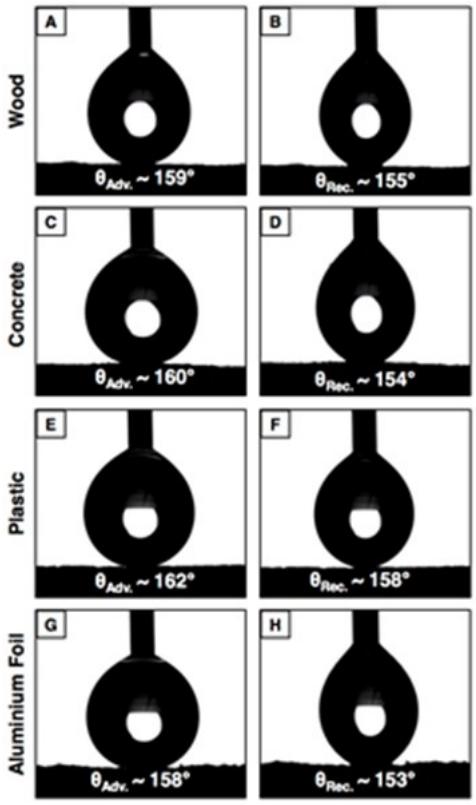

Fig. **S6** A-H) Advancing (A,C,E,G) and receding (B,D,F,H) contact angle of beaded water droplets on polymeric coatings that are deposited on various substrates, including wooden block (A-B), concrete (C-D), plastic (E-F) and aluminium foil (G-H).

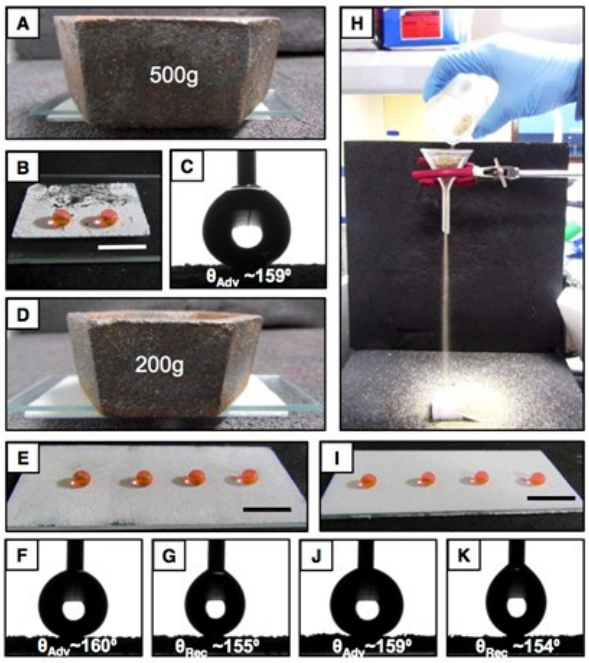

Fig. S7 A) Digital image of the set-up for adhesive tape test where the adhesive surface of the tape (2.5 cm x 1.5 cm) was brought in contact with the polymeric coating and 500g of load was applied for improving the contact between adhesive surface and polymeric coating. During the adhesive tape pulling process, the top portion of the film was transferred to the adhesive tape, B-D) Digital and advancing contact angle image of the beaded water droplet on the freshly exposed interior of the coating—which is transferred on the adhesive tape surface. D) Digital image of the sand paper abrasion test, where a sand paper (3 cm x 2 cm) was fixed on a glass slide, then it was kept over the polymeric coated glass substrate and rubbed back and forth for 10 times with a load of 200g. E-G) Digital, advancing and receding contact angle image of the beaded water droplets on the polymeric coating after the performance of sand paper abrasion test. H) Digital image of the set up for the sand drop test where 200g of sand impacted on the coated glass substrate from a height of 20 cm through a funnel. I-K) Digital, advancing and receding contact angle image of the beaded water droplet on the polymeric coating after conducting the sand drop test. (Scale bar ~1 cm).

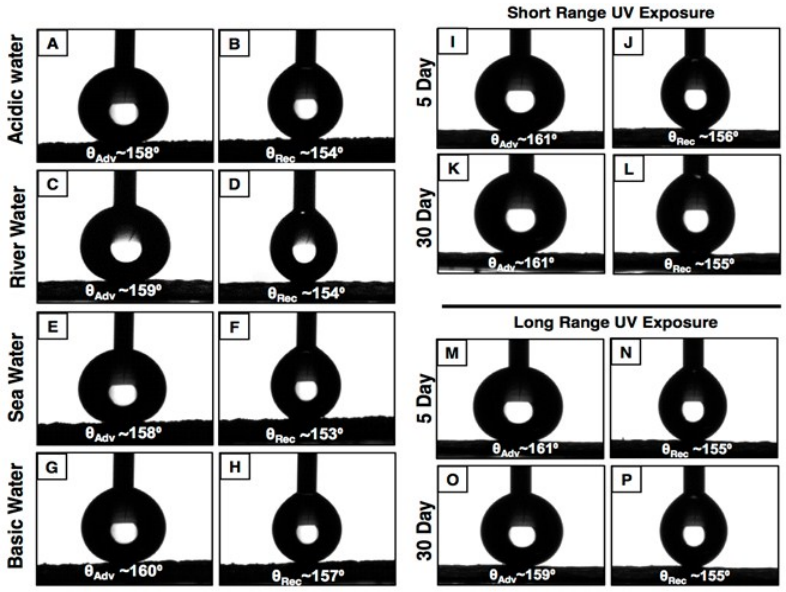

Fig. **S8** A-H) Advancing (A,C,E,G) and receding (B,D,F,H) contact angles of beaded water droplet on ODA modified polymeric coatings after 100 h incubation in different harsh aqueous phases including acidic water (A,B), river water (C,D), sea water (E,F) and basic water (G,H). I-P) Advancing (I,K,M,O) and receding (J,L,N,P) contact angles of the beaded water on polymeric coating after the exposures of UV (at λmax = 254 nm; I-L and at λmax = 365 nm; M-P) irradiation for 5 days (I-J, M-N) and 30 days (K-L, O-P).