

Supplementary Information

Flexible and mechanically stable antireflective coatings from nanoporous organically modified silica colloids

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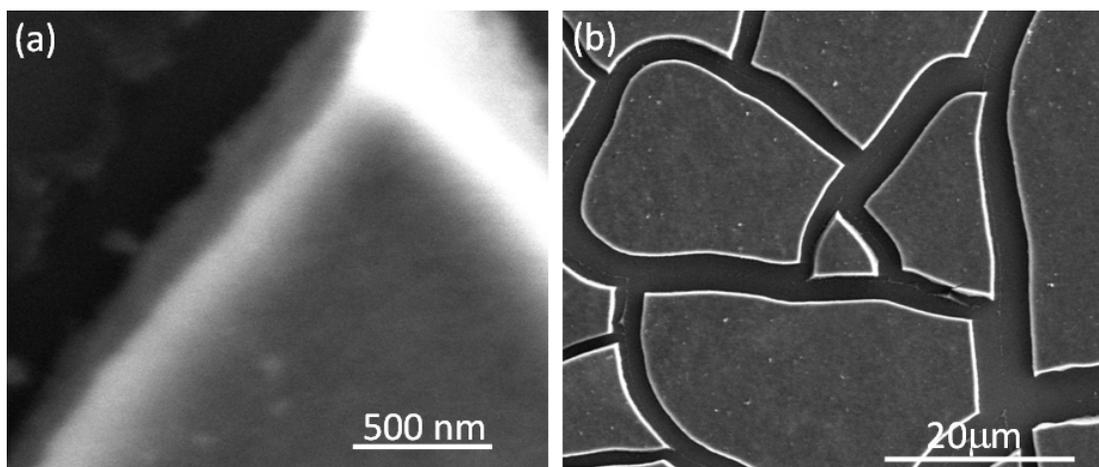


Fig. S1 SEM micrographs of T100 film taken under low vacuum conditions at (a) 150,000 and (b) 5,000 magnifications. Higher magnification image shows that film is not porous, pores occurring during gellation are shrunk. Lower magnification image indicates that film is not homogeneous, it is cracked. This shrunk and cracked structure of T100 film is due its hydrophilic nature. Capillary forces acting during drying cause silica walls of the pores to collapse. However, films even with small concentrations of MTMS (10%) can provide spring-back due to hydrophobic nature of this monomer.

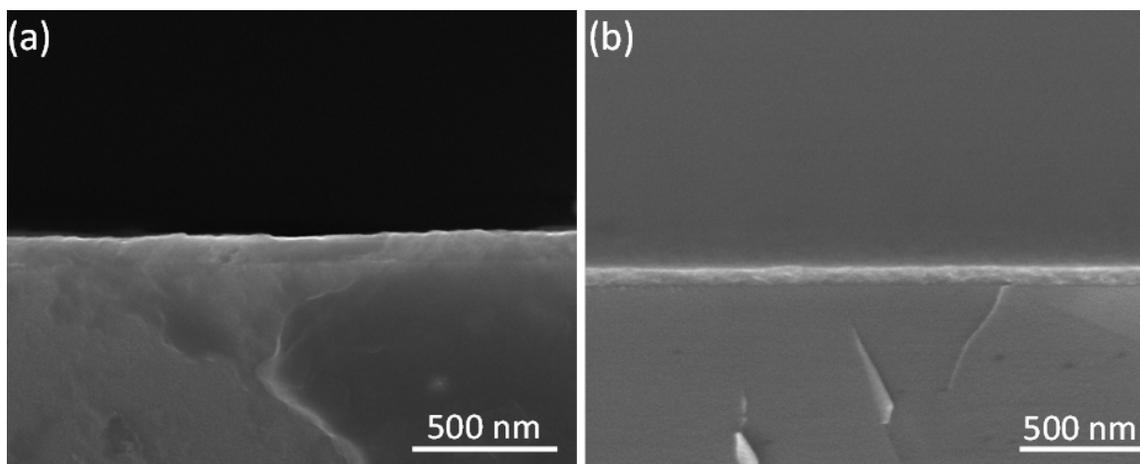


Fig. S2 Cross sectional SEM images of (a) T60 and (b) T75 films. Silicon is used as substrate for preventing charging. In order to obtain a good antireflective surface it is important to have small roughness values and homogeneous film thickness all over the sample in order to prevent scattering due to roughness and obtaining same efficiency from whole substrate. These images indicate that films have uniform thickness around 100 nm, and their roughness is low.

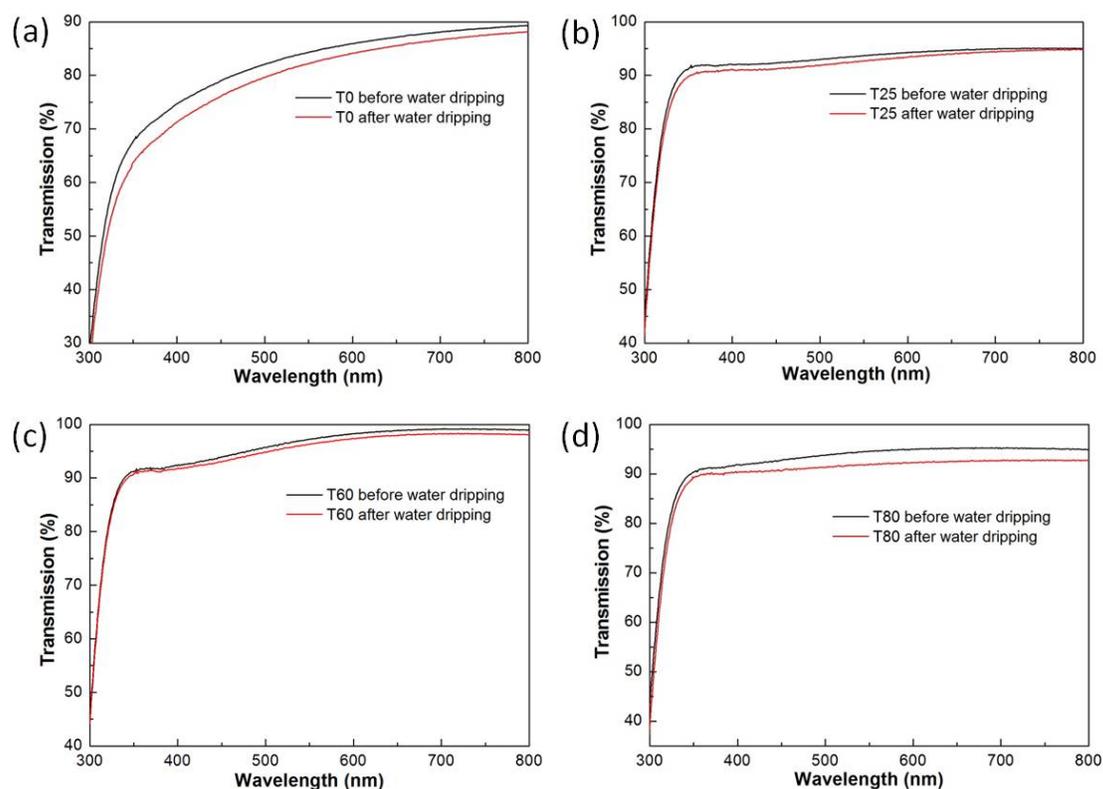


Fig. S3 Transmission graphs of T0 (a), T25 (b), T60 (c) and T80 (d) films on glass substrates before (black) and after (red) water dripping test. Except T60 film, all films are exposed to water dripping test for 24 hours (1 drops/s). T 60 film is further exposed to dripping test of totally 90 hours. These graphs indicate that decrease in transmission after excessive water dripping is very low. For T60 after 90 hours total decrease in transmission is only 0.9%, which shows that films are mechanically stable against excessive water dripping. This stability opens the way for outdoor usage of these films.

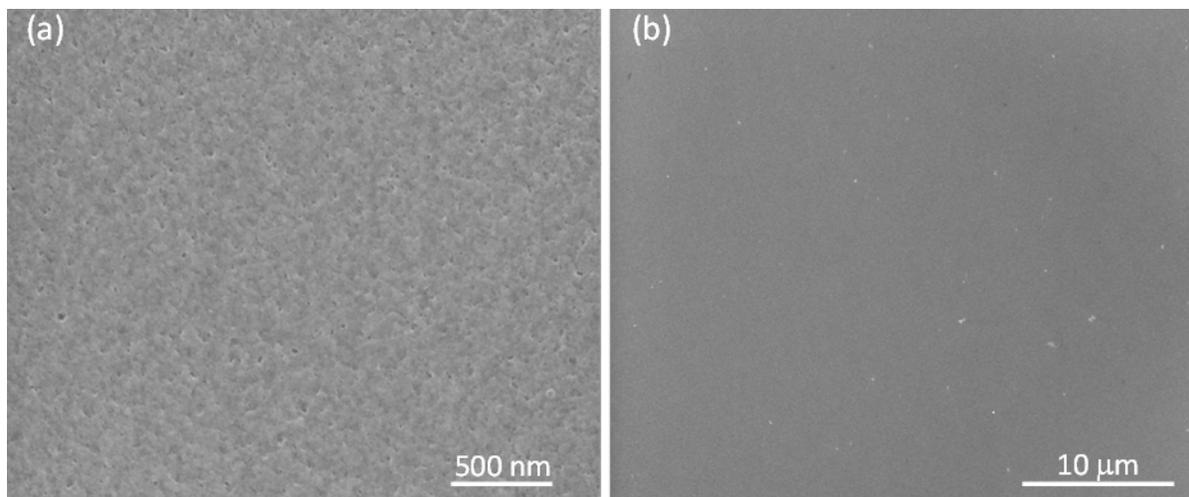


Fig. S4 SEM micrographs of T60 film on glass substrate following 90 hours water dripping test at (a) 100,000 and (b) 7,500 magnifications. Higher magnification image indicate that porous structure of the film is not affected after water dripping test. Lower magnification image indicates that the film is not removed from the surface and it is still homogeneous. The small particles seen on the surface are due to lime which is present on the tap water.

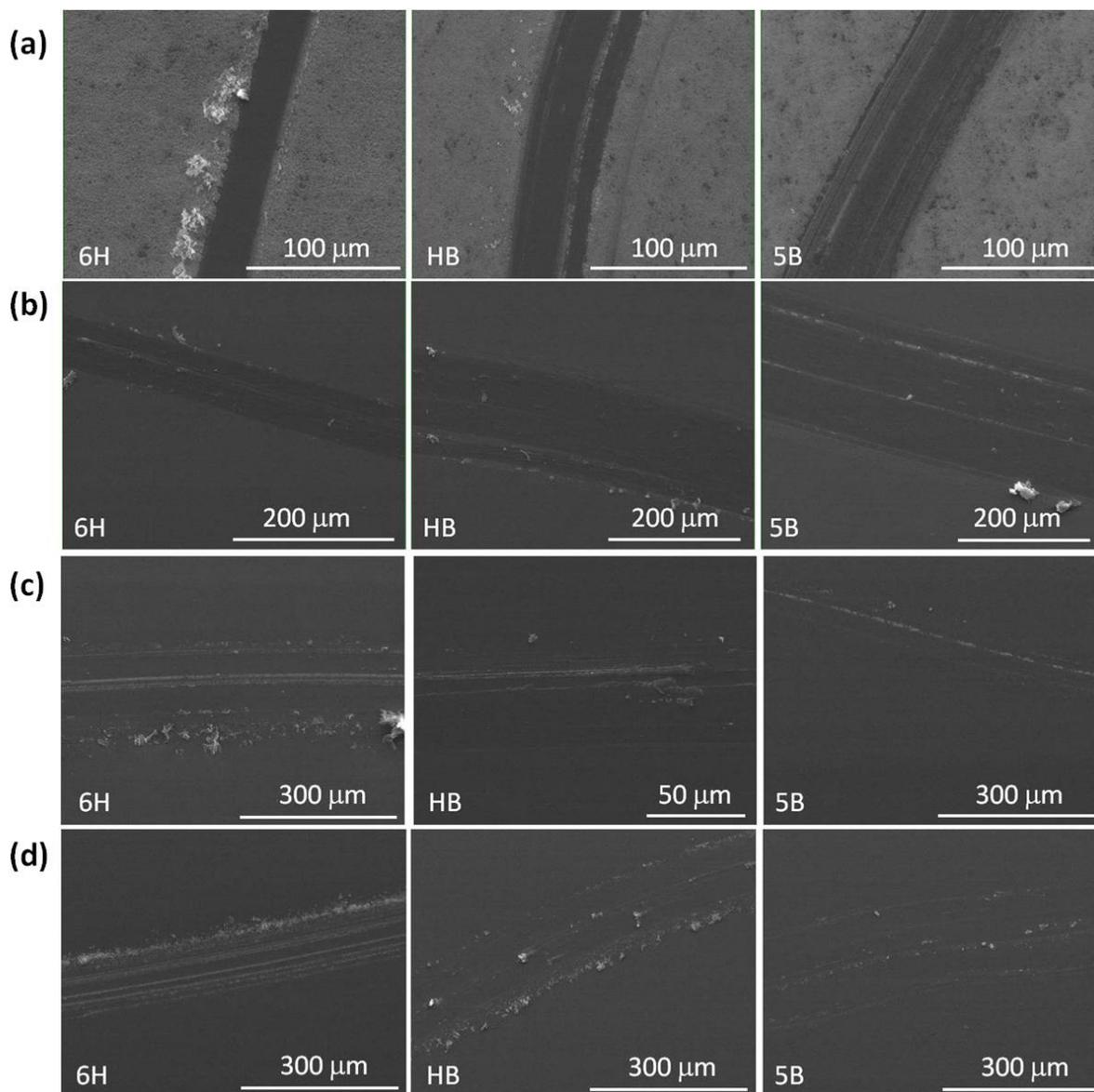


Fig. S5 SEM micrographs of T0 (a), T25 (b), T60 (c) and T80 (d) substrates after scratch tests with 6H, HB and 5B hardness pencils respectively. SEM images reveal that as the softness of the pencil increase, the damage caused by the scratch decrease.

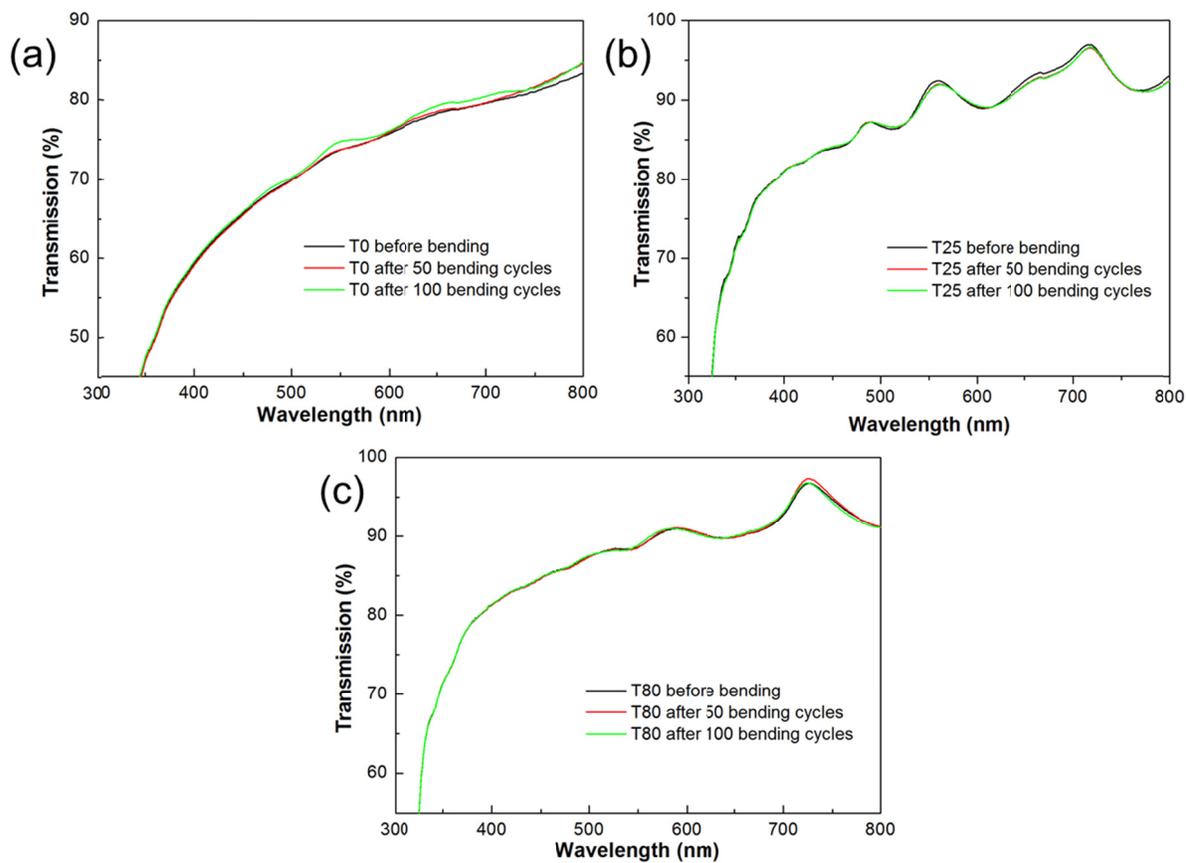


Fig. S6 Transmission spectra of T0 (a), T25 (b), T80 (c) CA substrates before and after 100 cycles of excessive bending indicating that films are flexible. Bending radius was 2.5 mm in the experiments.