

Robust Superomniphobic surface : Inspiration from Springtail

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Both high static repellency and pressure resistance are critical for a high-performance omniphobic surface. The cuticles of springtails have both of remarkable features, which result from their hierarchical structure. Despite intensive efforts, none of the previous studies that were inspired by the springtail were able to simultaneously achieve both features because of a general trade-off between them. We demonstrate for the first time a springtail-inspired superomniphobic surface displaying both features by fabricating a hierarchical system consisting of serif-T-shaped nanostructures on microscale wrinkles, overcoming previous limitations. Our biomimetic strategy produced a surface showing high repellency to diverse liquids, from water to ethanol, with a contact angle above 150°. Simultaneously, the surface was able to endure extreme pressure resulting from the impacts of drops of water and of ethylene glycol with $We \gg 200$, and of ethanol with $We \sim 53$, which is the highest pressure resistance ever reported.