

Bioinspired adhesion with liquid at the contact interface

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Reversible adhesions of many animals are often mediated by micro- and nano-structures and liquids. Two distinctly different types of structures specialized for strong and reversible adhesion on a variety of substrates have been identified: smooth pads and hairy pads. Both types of structures can maximize the formation of effective contact on the surfaces with a wide range of roughness and chemical compositions under various environmental conditions. The liquids are transported to or drained from the contact interface in order to enhance or avoid adhesions of attachment systems, playing a rather complex role. Inspired by the wet adhesions in nature, polymeric structures have been fabricated based on “bottom-up” and “top-down” methods. The adhesion and friction performances of these bioinspired structures are then investigated with the presence of liquid at the contact interface.