ICCM2014
28-30th July, Cambridge, England

The adhesion mechanism of a bio-inspired nano-film

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Understanding the adhesion mechanisms of biological systems can not only provide insights into the design of novel materials with super-adhesion function but also yield general principles employed in nature as inspiration and guidance for the development of biomimetic adhesive devices. Geckoes have a unique ability to climb and detach from ceilings and vertical walls using their attachment system. The smallest element (spatula) of the attachment system looks like a nano-film with finite scales. In order to disclose the micro-adhesion mechanism of geckoes, several factors that influence the adhesive behavior of geckoes are investigated in this report, such as the adhesive length of the nano-film-like spatula, pre-tension in a spatular pad, surface roughness and the environmental humidity.

Keywords: Adhesion mechanism, Biomimetics, Gecko, Spatula, Nano-film