

Geckos, white blood cells and diatoms: How biology inspires novel dry, switchable and self-healing adhesives

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Natural biotribological systems have been evolutionarily optimized over millions of years. Many of them have functional units in the micro- and nanometer regime. Natural biotribological systems have already inspired novel micro- and nanotechnological applications: dry adhesives, switchable adhesives and self-healing adhesives [1].

Examples presented comprise natural micromechanical systems made of nanostructured silica (diatoms produce hinges and interlocking devices on the micrometer scale and below [2]), adhesive molecules that can switch states and account for white blood cell rolling in endothelial cells [3], dry adhesives as they occur on the Gecko foot [4] and certain insect attachment pads [5], and single molecules that serve as strong self-healing adhesives (diatom underwater adhesives [6], abalone shell proteins [7]).

References:

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