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Biomimetic Adhesive Pads for Precision Manufacturing Robots

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Abstract : Inspired by the remarkable adhesion properties of gecko lizards, bio-inspired dry adhesives with smart adhesion properties have been developed in the last decade. Compared to earlier dry adhesives, the recently developed ones exhibit excellent adhesion strength, smart directional adhesion, and structural robustness. With these unique adhesion properties, bio-inspired dry adhesive pads have strong potential for use in precision industries such as semiconductor or display manufacturing. In this communication, we present a new manufacturing technology based on advanced dry adhesive systems that enable precise manipulation of large-area substrates over repeating cycles without any requirement for external force application. This new manufacturing technique is also highly accurate and environment-friendly, and thus has strong potential as a next-generation clean manufacturing technology.

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