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Pressure Tunable Adhesives via Self-Assembly

Pressure tunable adhesives provide continuous, customizable bond strength and are not limited by shape or scale, enabling significantly greater control over manufacturing, assembly, and soft-robotics applications.

Researchers at Purdue University have developed an adhesive that's response is dependent on the amount of force used to apply it. Pressure tunable adhesives (PTAs) enable customization of bond strength to better suit the process or application needed by the end user. While conventional approaches allow for discrete adjustment between high and low adhesion states, Purdue achieves continuous variability enabling significantly greater control over manufacturing and assembly processes. In addition to passive adhesion control, Purdue's PTAs aren't limited in shape or scale, and can be applied to large or curved surfaces. This technology offers promise in soft-robotics and could be integrated into pick-and-place tasks, transfer printing, and assembly processes.

Technology Validation: This technology has been validated through the fabrication and testing of sample adhesive devices, and pull-off tests which demonstrated a tunable pull-off force of 0.4 to 30 mN.

Advantages

-Passively tune-able adhesion

-Not limited by shape or scale

-Greater control over manufacturing or assembly process

Applications

-Smart adhesives

-Soft-robotics

-Pick-and-place assembly processes

-Manufacturing processes

Technology ID
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Category
Chemicals & Advanced Materials/Coatings, Adhesives & Sealants
Semiconductors/Fabrication & Process Technologies
Robotics & Automation/Automation & Control

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