Gripper with Shear-Induced Clamping (#8163)

A clean, easily detachable, and simple bio-inspired gripper.

Georgia Tech inventors have created a wall-shaped hierarchical microstructure as an alternative to the existing bio-inspired dry adhesives. This microstructure shows great potential for being a true “gecko-like” attachment surface and has served as the scientific and engineering foundation for the design of a clean, easily detachable and simple bio-inspired gripper. The gripper may revolutionize use of reversible attachment in applications involving pick and place transfer tools.

Benefits/Advantages

- Food processing:
  - Low cost: automating the collection process will significantly reduce the costs of food processing by reducing labor costs
- Technical uses:
  - Overcomes issues with current solution such as considerable technical expenditure, special geometry, chemical compatibility, or physical properties of mating surfaces and formation of residues

Potential Commercial Applications

- Food Processing: Automatic collection of food products such as eggs, fruits, vegetables and the like, that are picked up manually to date
- Technical uses: Pick & place applications in various industries
  - Packaging
  - Personal Care

Background/Context for This Invention

Temporary biological attachment systems allow animals to climb walls and walk on ceilings irrespective of their surface properties. Recently, researchers have started to engineer dry adhesives inspired by these systems involving thin-film-based contact elements. However, unlike prototype biological contact elements, the current artificial microstructure adhesives lack a non-sticky default state, strong shear-induced attachment, and insensitivity to surface conditions.

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Lifting a lemon, egg, and tomato without damaging the products

Clean, easily detachable, and simple bio-inspired gripper lifts a smart phone

For more information about this technology, please visit:
https://industry.gatech.edu/technology/gripper-shear-induced-clamping