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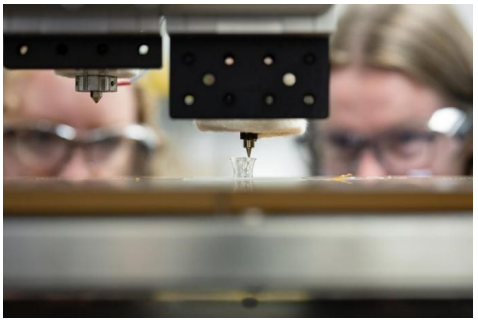
科苑快讯

可拉伸、可回收的柔性新材料

美国普林斯顿大学的工程师团队开发出一种3D打印技术，可生产定制版的兼具伸缩性和柔韧性的软塑料，而且还能回收利用，成本效益显著——这些优势在市售材料中颇为罕见。研究人员认为，该技术在柔性机器人、医疗设备、假肢、轻型头盔、定制版高性能鞋底等领域，具有潜在应用价值。

领导该研究团队的戴维森(Emily Davidson)详细介绍了他们使用热塑性弹性体(thermoplastic elastomer)制作刚度可调3D打印结构的方法。通过设计打印路径，工程师可对材料的物理属性编程，允许设备在一个方向上拉伸和弯曲，同时在另一个方向上保持刚性。戴维森说，弹性体形成了可控的纳米结构，可以创造出在不同方向上具有定制特性的材料。

为了有效诱导刚性纳米结构的排列，研究人员分析了用于控制印刷材料物理属性的印刷速度和受控挤压方式。在对材料加热和冷却的控制过程中，热退



火技术起到了关键作用。退火技术还具有自愈功能，切割后通过重新附着而修复后的材料与原始样品特性相同。

以前用液晶弹性体(liquid crystal elastomer)生产这类材料，价格高达每克2.5美元以上；而他们以热塑性弹性体为原料、以3D打印机为设备的制造成本仅为每克1美分。

(高凌云编译自2024年12月29日SciTechDaily网站)