Physical Science & Engineering

TechTransfer and Ventures

One-Part Carbon Nanotube-Silicone Ink

CNT-Elastomer Ink for Health Monitoring Applications

Traditional silicone inks involve short working time curing issues, requiring heat curing and limiting their compatibility with certain materials. They may also use harmful chemicals. These inks require molds, limiting their ability to be customized or scaled for biomedical applications.

Researchers at Virginia Commonwealth University have introduced a novel, room-temperature fabricated, one-part conductive carbon nanotube (CNT)-silicone ink enabling high-resolution advanced health monitoring devices.

The Technology

VCU researchers have developed a printable ink that is composed of amino-functionalized multi-walled CNTs and RTV silicone to create highly conductive and flexible 3D structures. Compared to current inks, the fabrication process uses non-toxic, inexpensive solvents, occurs at room temperature, and requires less than one hour of preparation time. Additionally, while two-part inks must be printed within a certain working time, this novel one-part ink can print continuously for greater than 2 hours and can be kept within a sealed syringe for days without sacrificing printability. In all, this one-part CNT-Silicone ink aims to improve upon current inks on the market by offering a conductive, flexible, and accessible solution to high-resolution wearable bio-sensors and soft robotics.

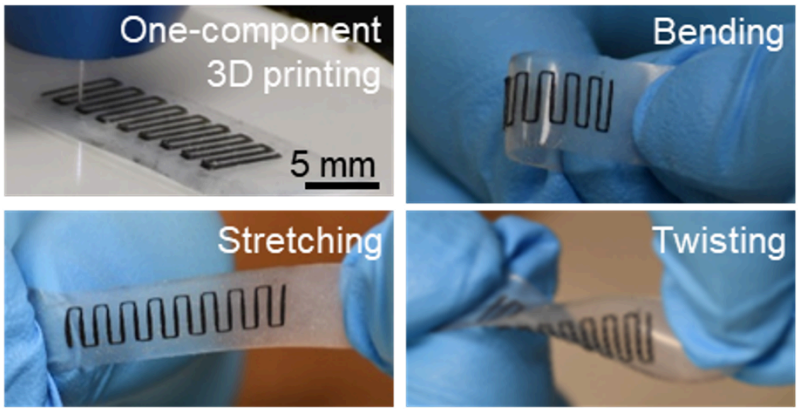

Figure 1. The one-part ink can easily be extruded on many substrates, and is conducive to bending, stretching, and twisting. Its electrical properties are highly responsive to detecting motion and biological signals.

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Benefits

- Extended shelf-life and reusable ink
- Room-temperature fabrication and curing
- Environmentally friendly and non-toxic solvent
- High-resolution 3D printing capability
- Versatile printing on various substrates
- Excellent mechanical flexibility and electrical conductivity

Applications

- Flexible and wearable health monitoring devices
- Sensors for prosthetics and human-machine interfaces
- Scaffolds for tissue regeneration and repair
- Flexible heating elements for therapeutic applications
- High-resolution, specific sensor and device manufacturing

IP Status:
Provisional patent application filed

Licensing Status:
This technology is available for licensing to industry for further development and commercialization

Category:
Engineering & Physical Science

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