Flexible And Stretchable Interconnects For Flexible Systems And Flextrate(Tm)

Tech ID: 29438 / UC Case 2018-219-0

SUMMARY

Researchers led by Professor Subramanian Iyer from the Department of Electrical Engineering at UCLA have developed a novel fabrication technique to create stretchable electronics.

BACKGROUND

Constant improvements to electronics fabrication techniques have allowed higher density packaging of dies, a small block of silicon upon which a circuit is fabricated. Typically these dies are placed onto rigid substrates, which make them inflexible. Its use an implantable medical device that requires flexibility to account for body movements and displacements. Some fabrication techniques allow for these dies to be integrated into flexible material like polydimethylsiloxane (PDMS). Although the integrative material is flexible, the metal connections on the dies can only stretch 0.2% before breaking and thus rendering the circuit useless.

INNOVATION

Researchers led by Prof. Iyer from the Department of Electrical Engineering at UCLA have developed a novel fabrication technique to create stretchable electronics. The innovation behind their fabrication is two-fold. Their fabrication embeds dies in a proprietary flexible substrate called flextrate that allow their electronics to bend, twist, and roll up. Second, they have created a way to make rigid, metal interconnects robust to stretching and bending. These two facets combine to make their electronics robust to over 500 cycles of stretching and rolling without having any broken connections and maintaining their efficiency of electrical conduction.

APPLICATIONS

- Flexible electronics
- Biocompatible electronics that require stretchability

ADVANTAGES

- Cheaply made
- Increased flexibility of electronics
- Durable over many stretch cycles
- Process is configurable for different:
- Interconnect materials (Au, Cu, etc.)
- Fabrication techniques (dry etching, photolithography, etc.)
- Flexible materials (not just PDMS)

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,538,764	12/27/2022	2018-219

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- A Plastic Synapse Based on Self-Heating-Enhanced Charge-Trapping in High-K Gate Dielectrics of Advanced-Node Transistors
- Power Distribution within Silicon Interconnect Fabric

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INVENTORS

- Iyer, Subramanian

OTHER INFORMATION

KEYWORDS

Stretchable, flexible, electronics, PDMS, parylene, medical devices, interconnects, fabrication, fan-out wafer level packaging, stretchable electronics, flexible electronics, biocompatible

CATEGORIZED AS

- **Biotechnology**
  - Other
- **Engineering**
  - Engineering
- **Materials & Chemicals**
  - Electronics Packaging
- **Medical**
  - Devices
- **Semiconductors**
  - Design and Fabrication

RELATED CASES

2018-219-0

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