Enhanced Dielectric Epoxy for Electronic Devices (#7073)

A method to lower the dielectric constant of epoxy for electronic applications

Georgia Tech researchers have developed a method to significantly decrease the dielectric constant and loss of epoxies by incorporating closed-pores within the epoxy material. The pores are created by modifying the epoxy monomer with a pore-creating component. Upon molding and heat treatment of the epoxy, the porogen reacts and decomposes to create small, closed-pores within the epoxy film. This reduces the risk of cracks and continuous air-pathways throughout the film, which may result in deteriorated mechanical properties. This new epoxy matrix with closed-pores reduces the dielectric constant and loss of the bulk material.

Benefits/Advantages

- **Cost Effective** – Modified epoxy is lower cost than advanced, high performance polymers
- **Effective –** Lowers dielectric constant and loss of the material
- **Non-destructive –** Does not deteriorate the mechanical properties of the material

Potential Commercial Applications

- Electronics
- Printed wiring boards
- Integrated circuits

Background/Context for This Invention

Polymers are insulating materials used for fabricating printed circuit boards and electrical devices, such as a computer or cell phone. Epoxies have many desirable properties, however, they suffer from high capacitance and loss, which can slow down electronic devices, and cause cross-talk. Epoxy polymers are low-cost and have excellent chemical resistance and adhesive properties. The electrical performance can be improved by decreasing the dielectric constant and loss of epoxy materials.

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More Information

Publications

For more information about this technology, please visit:
https://licensing.research.gatech.edu/technology/enhanced-dielectric-epoxy-electronic-devices

Images:

The automated sequential delivery of multiple fluids. A varying number of delay gates imprinted in the branches are shown in the figure.

COVID-19 and flu saliva test on paper: (A) The automatic sequential delivery of multiple reagents required for virus test; (B) Water pouring into the device triggers the virus assay, allowing the presence of SARS-CoV-2 and influenza A & B viruses to be visually identified by the color changes in the corresponding detection spot