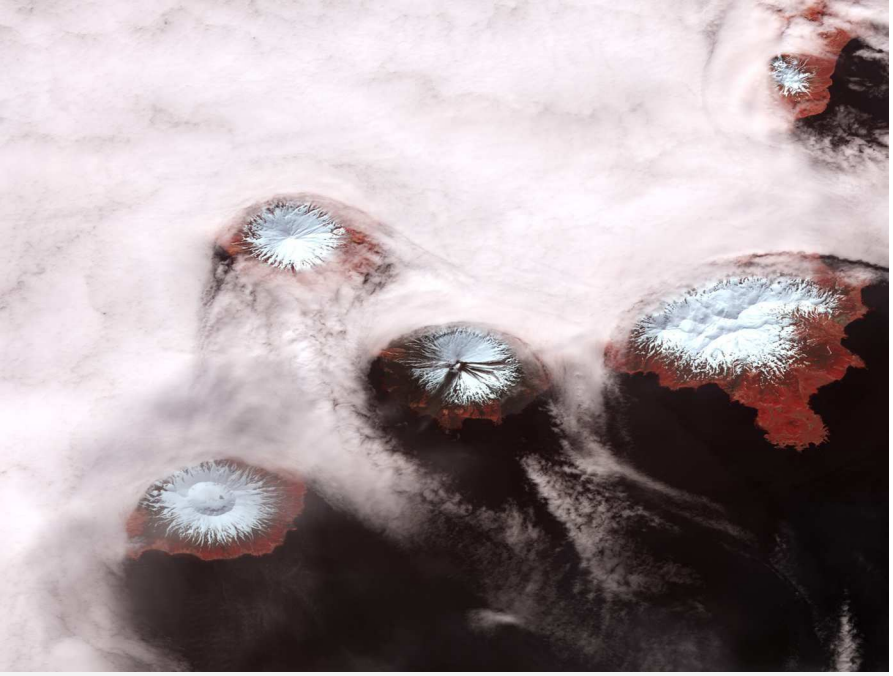

National Aeronautics and
Space Administration

Electrical and Electronics

Graphene Field Effect Transistors for Radiation Detection (GFET-RS)

A versatile new technology for radiation sensing

NASA Goddard Space Flight Center has developed novel transistor technology based on a single graphene layer coupled to a radiation absorber substrate. Unlike conventional charge-sensing detectors, the GFET-RS utilizes the sensitive dependence of graphene conductance on local change of the electric field which can be induced by interaction of radiation with the underlying absorber substrate. This technology provides low power consumption and high sensitivity radiation sensors for the commercial space industry and government agencies. This technology can also be important in future heliophysics science missions, where small, light-weight radiation sensors such as GFET-RS can be used on arrays of CubeSats.

BENEFITS

- Flexible structure
- Wide temperature range
- Low power consumption
- Small and light-weight

technology solution

THE TECHNOLOGY

The GFET-RS consists of a graphene piece deposited on a silicon substrate with a certain thickness of insulation layer. Graphene is patterned by e-beam lithography, followed by reactive ion etch to form the desired length and width. Palladium/gold source/drain contacts are defined on top by another e-beam lithography step. Graphene is radiation-hard and its conductance changes with radiation.

APPLICATIONS

The technology has several potential applications:

- High sensitivity radiation sensors
- Science applications based on small satellites such as CubeSats.
- Commercial space applications

PUBLICATIONS

Patent No: 9508885

More Information

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