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Novel Flexible Ag-Chalcogenide Glass Sensors for Radiation Detection

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Intellectual Property Status:

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Background

Radiation sensors have multiple applications, ranging from survey monitors used to supervise the generated radioactive waste at nuclear power plants to personal dosimeters which measure the radiation dose accumulated in individuals. However, most of the existing personal dosimeters are costly to manufacture, suffer from poor signal retention, and require cryogenic temperatures to operate precisely and accurately. Additionally, existing detectors are often stand-alone devices that require complex systems to incorporate their detection capabilities into external circuitry. Therefore, there is a need for an inexpensive, simple, and durable radiation sensor.

Invention Description

Researchers at Arizona State University have invented a flexible Ag-Chalcogenide glass sensor for radiation detection. The detectors are fabricated on low cost substrates and are intended as disposable sensors. Electrode geometry of the Ag-Chalcogenide material can be used to determine or modify the radiation sensor operating parameters. Compared to previous technologies, these thin film radiation sensors are simpler in form and function, and cheaper to produce and operate. The sensors measure dose through resistance change, and are suitable for applications such as reactor dosimetry, radiation chemistry, and clinical dosimetry. This technology is ideal for wearable devices due to the lightweight construction, inherent robustness to resist breaking when mechanically stressed, and ability to attach to non-flat objects.

Potential Applications

- Radiation detection and dosimetry
- Health and medical physics
- Wearable and non-flat surfaces

Benefits and Advantages

- **Adaptable** – The ability to adjust the dynamic range and limit of detection allows for a wider range of application and use.
- **Inexpensive** – Low material and manufacturing costs.
- **Flexible** – Can be used as a wearable device and can be attached to non-flat surfaces.
- **Durable** - Tolerates high bending strain without compromising device functionality or structural integrity.
- **Fast** – Device is capable of instantaneous readout with a low voltage.