

# DHS Science and Technology Directorate

## Improving Radiation Confirmation Technology – Development of an Organic Radiochromic Compound for First Responders

### Using R&D Funding to Fill Gaps in the Interagency Rad/Nuc Response and Recovery Architecture

Hazards involving radiation pose specific challenges to first responders conducting response and recovery operations because exposure to radiation cannot be confirmed without the use of detection equipment. While detection equipment exists, first responders have identified as a possible response technology objective the ability to integrate detection and identification capabilities into existing equipment or personal protective equipment (PPE). This would address radiological and nuclear capability needs and priorities of first responders. Methods that improve responders' abilities to quickly confirm the presence of radiation and in real time allow for self and peer monitoring, and may have the potential to improve response and recovery operations and the safety of first responders working during radiation emergencies.

### Partnering with SRNL to Develop ORC

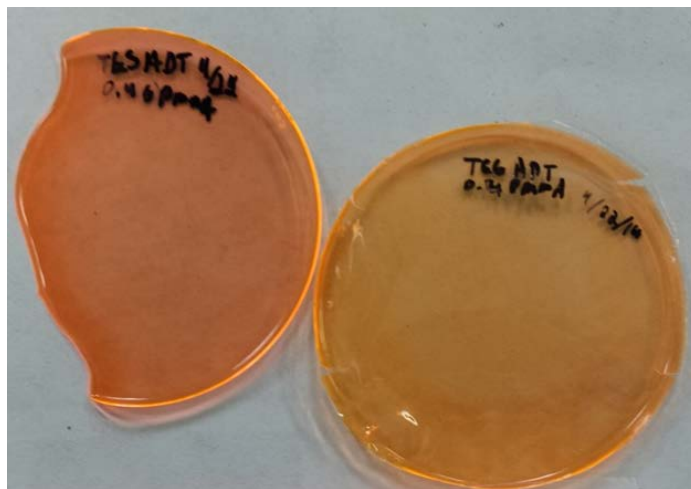
DHS S&T is working with Savannah River National Laboratory (SRNL) to develop, engineer and bench test an organic radiochromic compound (ORC) that can be applied to, or integrated with, existing response equipment. It would produce a visible color change or radiation-induced fluorescence at pre-determined radiation levels that are of significance to first responders conducting operations. SRNL will research responder requirements and then engineer the ORC to meet these technical specifications.

### Innovative Applications to Support Response Operations and Responder Safety

Once the ORC is bench tested, SRNL will explore how the material could impact a wide-variety of operations conducted during a radiological response including mass fatality management, waste and debris management, and public and responder safety.

### Anticipated Results of this Project

Through this project, it is anticipated that DHS S&T will provide the specifications for an ORC that can be applied to existing first responder equipment to support response and recovery operations during a radiological emergency by quickly and visibly identifying the presence of certain levels of radiation. A wide-range of applications of the ORC will also be explored in this project.



*Poly methyl methacrylate wafer with radiochromic organic materials incorporated into the polymer/Savannah River National Laboratory.*

### Building Critical Relationships and Partnerships to Support Rad/Nuc Preparedness

As with all projects in DHS S&T's Rad/Nuc Response and Recovery R&D portfolio, this work relies heavily on first responders and interagency workgroups to assist in the scoping and prioritizing of initiatives.

The research and development associated with this project is being conducted with the following DHS S&T partners:

- Savannah River National Laboratory
- University of Kentucky



**Homeland Security**

Science and Technology

To learn more about DHS S&T's Radiological/Nuclear Response and Recovery R&D Program at NUSTL, please contact Ben Stevenson at [benjamin.stevenson@hq.dhs.gov](mailto:benjamin.stevenson@hq.dhs.gov) or [NUSTL@hq.dhs.gov](mailto:NUSTL@hq.dhs.gov).