FROM SENSING TO MAKING SENSE

Versatile Materials For Wide-ranging Applications Of Colorimetric And Electronic Detection Of Chemical Warfare Agents

Ian Pardoe US Army DEVCOM Chem Bio Center

Researchers at the US Army DEVCOM Chemical Biological Center (CBC) have developed and refined new novel materials for colorimetric detection of multiple classes of chemical warfare agents. By leveraging the color-change response of ligand exchange in cation-exchanged porous crystalline materials, CBC is currently developing novel colorimetric materials capable of detecting liquid, solid, aerosol, and vapor phase CWA simultaneously. Current research and development objectives include optimizing different form factors of these materials for different applications to include point detection, perimeter monitoring, environmental fate elucidation, remote sensing, integration into networked sensors, and leave-in-place passive monitoring. In addition, certain form factors of these materials can also elicit an electrical response upon CWA exposure as well. Additional work is performed to leverage this orthogonal response to increase confidence in detections and lower false alarm rates which plague many colorimetric sensors. This talk will cover the background of these materials, current capabilities of the raw materials to detect various forms of CWA, then cover the broad range of applications in which the materials are being evaluated for CWA detection, to include the motivations for developing many different form factors into which the materials are being integrated for different capability development, including dispersible powders, colorimetric paper for point detection, paints for passive monitoring, polymer films for integration into flexible fabrics, and small circuits for electronic sensing. Several of these application development efforts have been and are currently supported by our partners at DTRA, and this talk with include results from both these DTRA-supported efforts as well as outside efforts. The vision for the future of these materials and new applications in development will also be presented.

Dr. Jennifer Soliz, DTRA/DEVCOM CBC