

**PERSONNEL**

The CTT staff has a varied expertise in chemical engineering, chemistry, materials science, plastics engineering, textile technology and polymer science. Our personnel regularly collaborate with the academia, the industry and government agencies and laboratories.

**FACILITIES:**

- Man-In-Simulant Test chamber (MIST) for prototype evaluation.
- Automated Robotic Vapor Adsorption Test (ARVAT) for assessing sorptive capacity and the shelf life of current protective gear in storage.
- Bioaerosol chamber for investigating the efficacy of sporicidal and biocidal treatments.
- Aerosol chamber for characterizing particulate matter penetration
- Dynamic Moisture Permeation Cell (DMPC) for moisture vapor transport.
- Hiden Isochema and Cahn balance for sorption characterization.
- Various test cells, detectors and simulants for liquid, vapor and droplet permeation through barrier materials.
- GC-MS (gas chromatography-mass spectrometry), NMR (nuclear magnetic resonance) and LC-MS (liquid chromatography-mass spectrometry) for reaction testing.
- Automatic tilt-base goniometer for measuring surface tension and contact angles.
- Access to thermal manikins, standardized textile testing, standardized fire retardancy testing, prototyping facility, electrospinning, human 3D modeling and more.

**CHEMICAL  
TECHNOLOGY  
TEAM  
(CTT)**



**US ARMY NSRDEC  
WARFIGHTER SCIENCE, TECHNOLOGY &  
APPLIED RESEARCH DIRECTORATE  
MATERIALS & DEFENSE SCIENCES DIVISION**  
AMSRD-NSR-WS-CB  
15 Kansas Street  
Natick, MA 01760-5020  
COMM: 508-233-4478, DSN: 256-4478  
FAX: 508-233-5104  
EMAIL: nati-amsrd-nsc-ss@conus.army.mil

**ON THE WEB:**

[nsrdec.natick.army.mil](http://nsrdec.natick.army.mil)

**MEDIA INQUIRIES:**

(508) 233-6938  
[nati-amsrd-nsc-ad-b@conus.army.mil](mailto:nati-amsrd-nsc-ad-b@conus.army.mil)





# CHEMICAL TECHNOLOGY TEAM (CTT)

## MISSION:

The CTT is committed to providing the next generation in chemical and biological (CB) protective garments through the development of novel ideas and basic research to prototypes, field demonstrations and Soldier system integration.

## CAPABILITIES:

### Super-Oleophobic (SO) Coatings

SO coatings have low surface tensions for non-wetting, self-cleaning textiles with enhanced CB protection through liquid repellency.



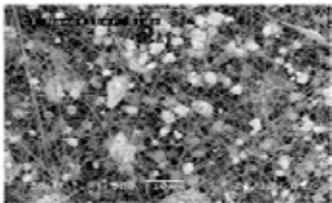
### Selectively Permeable Membranes

Elastomeric films with a high moisture vapor transport have the potential to replace current carbon-based CB uniforms and barrier films to lighten the load of the Soldier and provide increased comfort.



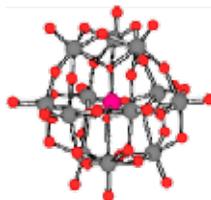
### Aerosol Protection

Nanofiber meshes and biocidal treatments kill spores and other biological threats while preventing particulate matter from penetrating.



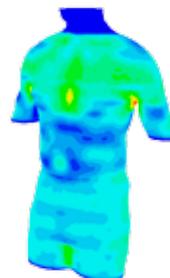
## Multi-Functional Materials

Adsorbent materials and reactive membranes can degrade warfare agents and provide better CB protection than barrier materials alone. "Smart" materials sense agents and react accordingly.



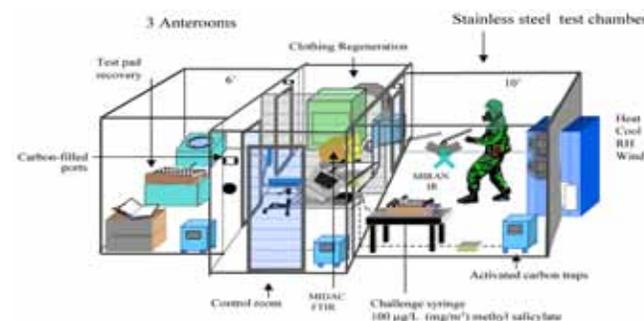
## Thermal Modeling

CB protection is accompanied by a heavy thermal burden by reducing the effectiveness of evaporative cooling on the body. Simulations detail where heat accumulates and help optimize protection with comfort.



## Closures and Venting Strategies

Novel approaches to closures and seams prevent CB threats from permeating through open areas. Including vents in the fabric system increases thermal comfort in benign environments.



## Protective Ensembles/Soldier System Integration

Integrating protective fabric concepts into a novel CB system requires consideration of many factors pertaining to garment design, comfort, and durability. It is critical to know how the prototype will function on the Soldier, with the equipment he has to use and carry, and how the performance of the Soldier will be affected by the protective ensemble throughout the range of activities in which the Soldier will be engaged.



## Technology Transition

The collaborative research and development done with industries large and small, and network of contacts among textile suppliers enables the chemical technology team to transition novel ideas on paper to commercial applications.

