# Advanced Textiles to Inactivate Chemical and Biological Threats

Technology #13854

## Applications

This technology can be used for a variety of purposes, including the following: chemical inactivation coating, as in HAZMAT suits; military protection, such as from nerve or mustard gas; in a laboratory setting for filters for chemical hoods, and coatings for disposable face masks and lab coats; and bactericidal coating for highly trafficked areas and on protective clothing.

## Technology

Polymeric nanofibers (250-500nm) are formed by electrospinning, a process where droplets of polymer are drawn into thin threads via a strong electric field. The threads can be used as single-strands or are woven into larger pieces of cloth.  The cloth or fiber is chemically treated via layer-by-layer functionalization to introduce chemical or bacterial inactivation moieties (chemically-reactive polyanion and bactericidal polycation coatings respectively).  The technology has been reduced to practice at the laboratory scale and was demonstrated to degrade diisopropyl fluorophosphate (DFP - a close analog of the chemical warfare agent sarin) and was shown to kill E. coli and S. epidermidis. Due to the fiber size, the resulting cloth is lighter and more breathable than current protective fabrics.

## Advantages

- Functional coating which can be applied at an industrial scale
- High porosity allows for breathable fabrics

## Categories For This Invention:

Materials
Fabrics, Fibers & Textiles
Life Sciences
Biomaterials
Composites
Micro/nanoparticles (Biomaterials)
Research Tools
Other (Research Tools)
Therapeutics
Drug Delivery

## Intellectual Property:

Multifunctional electroprocessed membranes
Issued US Patent

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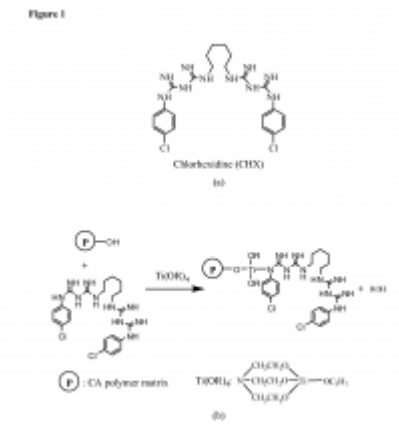
## Publications:

Multifunctional Electrospun Fabrics via Layer-by-Layer Electrostatic Assembly for Chemical and Biological Protection
Chemistry of Materials
2010, 22 (4), pp 1429–1436

## External Links:

Rutledge Group
http://web.mit.edu/rutledgegroup/
Hatton Group
http://web.mit.edu/hatton-group/

## Image Gallery:



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