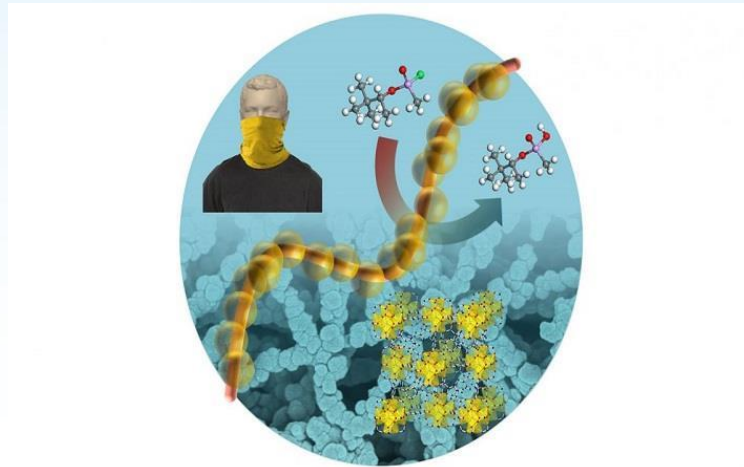


Researchers Make Fabric to Degrade Chemical Warfare Agents



Researchers at the North Carolina State University have created a fabric material containing nanoscale fibres that are capable of degrading chemical warfare agents (CWAs). The paper on the research is named, "Ultra-Fast Degradation of Chemical Warfare Agents Using MOF-Nanofibre Kebabs" and published in the journal *Angewandte Chemie International Edition*.

Uniform coatings of metal-organic frameworks (MOFs) were synthesized on top of the nanofibres, forming unique kebab-like structures. These MOFs break down the CWAs, rendering them harmless.

The researchers begin by depositing a thin film of titanium oxide onto a fabric made of nanoscale fibres using a vapour-phase technology called atomic layer deposition. The titanium oxide serves as a nucleation layer, which enables the researchers to apply various zirconium-based MOFs onto the nanofibres in an evenly distributed way.

The researchers then tested the MOF-functionalised fabric against both a CWA simulant and the nerve agent, soman. They found that, when exposed to the nano-kebab fabric, the half-life of the CWA simulant was as brief as 7.3 minutes. The half-life of the soman was as short as 2.3 minutes.

Junjie Zhao, a former Ph.D. student at North Carolina State University and lead author of a paper on the work said, "Current technologies for addressing CWAs rely on carbon-based materials – but these carbon materials can only adsorb hazardous compounds, they can't degrade them. Our goal was to develop new materials that can detoxify these CWA compounds, and we've been successful."

"Previous research had found that MOFs can be effective at degrading CWAs. However, MOFs normally come in the form of a powder. We wanted to see if we could grow MOFs as functional coatings onto fibres, so that they could be used in masks, filters and protective garments. We found that the MOFs formed on the nanofibres in a kebab-like structure, with the MOFs uniformly covering the entire nanofibres, like meatballs on a skewer" Zhao said.

The CWA degradation research was conducted by researchers in Gregory Parsons' group at NC State, and co-workers at RTI International and the Edgewood Chemical Biological Center. (GK)

Provided by *Fibre2Fashion.com*

No.207 October 2016