

## **PROTECTION - SCIENCE AND TECHNOLOGY ADVANCES FOR CHEMICAL AND BIOLOGICAL PROTECTION**

### **Passive Filtration Of Toxic Gases In Enclosed Spaces Using Metal-organic Framework Textile Composites**

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Metal-organic frameworks (MOFs) are advanced adsorbents with applicability to military and civilian applications including but not limited to chemical biological protection, chemical warfare agent decontamination, toxic industrial chemical remediation, and energy storage. These materials have been produced in ton-scale quantities and have seen commercial use in the electronics and specialty chemicals sectors.

However, these materials are not currently being used to increase survivability during accidents in enclosed spaces, such as disabled submarines (DISSUB). During a DISSUB, atmospheric contaminants such as nitrogen dioxide, chlorine, and ammonia are produced from battery malfunctions, fires, and the build-up of human waste. These Submarine Escape Action Limit (SEAL) gases reduce the survivability of survivors waiting to be rescued. This presentation will demonstrate that MOF-based scrubbing solutions for the environments inside enclosed spaces, such as submarines, performant in removing SEAL gases, and scalable to outfit in-service and future submarines.

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