

Lumpkin Auditorium 2030  
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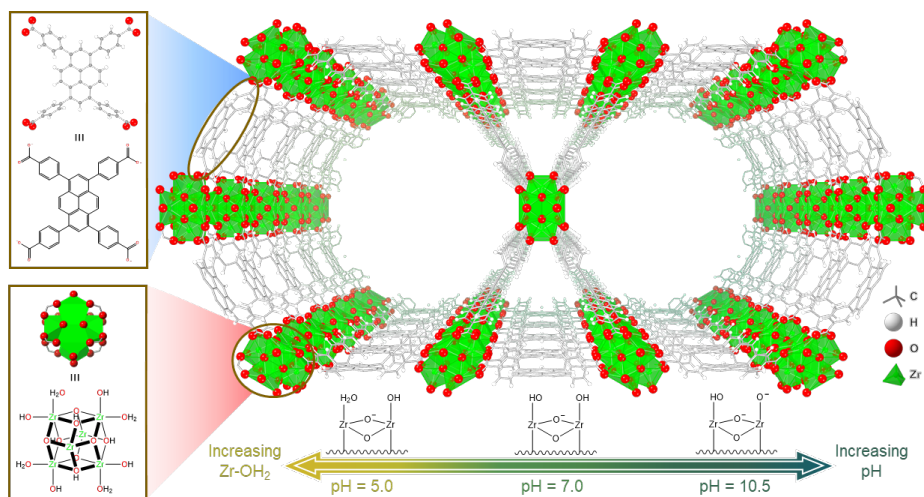
## How to Destroy a Chemical Warfare Agent

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### Abstract

Universally banned by international convention, chemical warfare agents (CWAs), and especially nerve agents such as Sarin, Soman, and Novichok, are insidious threats. Unfortunately, despite being banned, they have repeatedly been used against humans by both rogue states and non-state actors. In part because they are fast acting, detoxification-based protection against these agents presents an extraordinary chemical challenge. This presentation will offer an overview of our development of effective countermeasures based on enzyme-inspired arrays of artificial catalysts. Key to the development has been mechanistic understanding of the chemical basis for rapid, catalytic, hydrolytic degradation of simulants of organo-phospho-ester based chemical warfare agents. A multitude of interlocking phenomena and effects are found to modulate catalytic activity, determine turnover numbers, and select for rate-determining steps. What emerge from mechanistic studies are robust design-rules for effective porous-materials-based catalysts. These materials now constitute the catalytically active components of robust, washable prototype clothing for protection against CWAs.



**Figure 1.** Portion of an ultrahigh surface area material that rapidly & catalytically degrades and detoxifies G-type nerve agents.