

ISRP 2002 abstract

Presenter/author	Title	Abstract
Gardner, Paul D. <i>US Army Edgewood Chemical Biological Center</i>	Development of an End-of-Service-Life Indicator for NBC Mask Filters	<p>A research effort has been initiated by the U.S. Army Edgewood Chemical Biological Center to develop a low-cost, qualitative end-of-service-life indicator (ESLI) for future generation NBC protective mask filters. An ESLI is desired that will allow users to know when to replace a filter and at the same time provide confidence that the filter is operational. The most promising approach relies on colorimetric indicator technology and involves the use of a flexible thin-film substrate coated with color-changing reagents that target common functional groups and/or chemical properties of a wide range of chemical warfare agents, including select toxic industrial chemicals. The concept is to place the indicator film along the perimeter of the carbon sorbent bed where it can react with the passing contamination wave front. A transparent window incorporated in the filter housing would be used to view the distinctive color/pattern change, thus alerting the user to replace the filter.</p> <p>Proof-of-concept testing of candidate reactive dye-based films specially formulated to detect acid gases and acidic degradation byproducts caused by the hydrolysis of nerve and blister agents has yielded promising results. Certain indicator film formulations tested against sarin, sulfur mustard, cyanogen chloride, hydrogen cyanide and phosgene were able to detect most of the target challenge agents with parts per million sensitivity. These results, along with those of additional evaluations performed using ASZM-TEDA carbon test beds, demonstrate the feasibility of developing an ESLI effective for a broad class of chemical warfare agents and toxic industrial compounds.</p>