Development of a Glove End of Service Life Indicator (ESLI) for Weak Organic and Inorganic Acids

Evanly Vo, National Personal Protective Technology Laboratory, National Institute for Occupational Safety and Health, Pittsburgh, PA, USA (Corresponding Author)
Tom Klingner, Colormetric Laboratories, Inc., Des Plaines, IL, USA
Zhenzhen Zhuang, National Personal Protetive Technology Laboratory, National Institute for Occupational Safety and Health, Pittsburgh, PA, USA

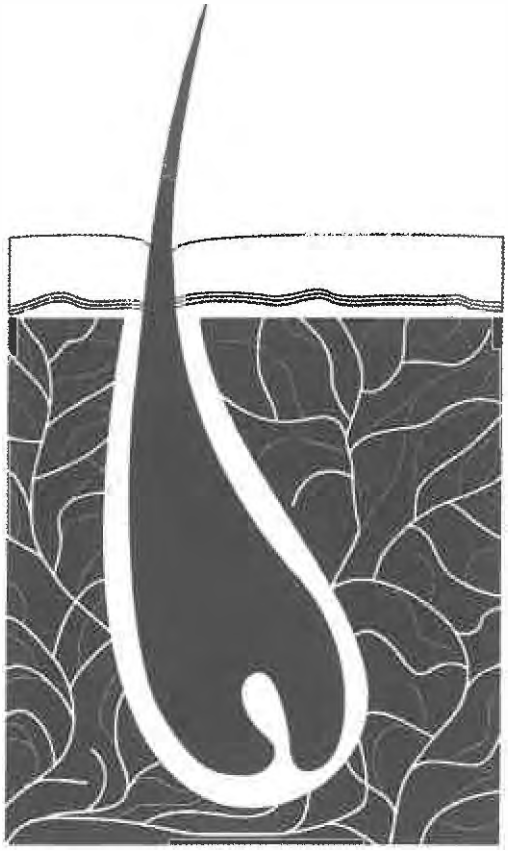
A commercially available colorimetric indicator used to detect permeation of acid/base compounds through chemical protective gloves was previously evaluated (Vo, The Analyst, 127:178-182, 2002) and was found to be insufficiently reactive toward weak organic acids. Exposure to propionic acid, acrylic acid and other weak acids was of sufficient concern to merit the development of an alternative indicator system that allows the detection of these chemicals.

A new indicator pad based on the use of 2-[4-(dimethylamino) phenylazo] benzoic acid, sodium salt was developed. This indicator produces a visible color change in a pH range of 5-6 allowing detection of these weak acids. In addition, a method to quantitatively determine the exposure dose of permeating chemicals to the indicator pad was developed using solvent desorption and gas chromatography.

The pad was used to detect both organic and inorganic acid permeation through six representative polymeric glove materials. A comparison of the indicator response to breakthrough times was determined by using a modified ASTM F-739 procedure with an infrared analyzer. The indicator proved highly sensitive and reliable in detecting and collecting acid permeation occurring through gloves and as use as a field validation method for glove performance.

International Conference on Occupational and Environmental Exposures of Skin to Chemicals: Science and Policy

Conference Chair: Sidney Soderholm, PhD



September 8-11, 2002
Hilton Crystal City

Final Program
Plenary Presentation Abstracts
Poster Abstracts