

ISRP 1999 abstract

Presenter/author	Title	Abstract
<p>Hori, Hajime Ishidao, T. Ishimatsu, S. Arashidani, K.</p> <p><i>Department of Environmental Management, School of Health Sciences University of Occupational and Environmental Health 1-1 Iseigasks, Yahatanishitu Kitakyushu 801- 8555 Japan</i></p>	<p>Detection of Breakthrough of Organic Vapors in a respirator Cartridge Using a Semiconductor Sensor</p>	<p>To predict the breakthrough of organic vapors in a respirator cartridge when a worker is wearing it is usually difficult because the service life of the cartridge for organic vapor depends on many factors, such as, the kinds of vapors, concentration, temperature, relative humidity and the respiratory rate. In this study, a method for determining the breakthrough of the vapors in the respirator cartridge was developed. Air containing organic vapors was introduced into the cartridge, and the breakthrough curve was obtained by measuring the vapor concentration at downstream of the respirator with a gas chromatograph (GC) equipped with a flame ionization detector. Simultaneously, an output signal from a semiconductor sensor that was inserted in the downstream of the cartridge was recorded in an IC card temporarily. After the measurement, the data recorded in the card were transferred to a personal computer and the change in the output signal from the sensor was compared with the breakthrough curve obtained by the GC. More than eight kinds of solvents including aromatic hydrocarbons, chlorinated hydrocarbons, acetates, alcohols, ketones and aliphatic hydrocarbons were tested. The sensitivity of the sensor for chlorinated hydrocarbons was generally low, especially when the relative humidity was high, but the rising time of the signal from the sensor was almost the same as or earlier than the breakthrough time obtained by the GC. These results suggest that because the sensor has similar or greater sensitivity for many organic vapors, it is applicable as a detector of the breakthrough in respirator cartridges for organic vapors.</p>