NEWS FEATURE - Electronic nose knows, warning with color-changing badge

By R. Colin Johnson
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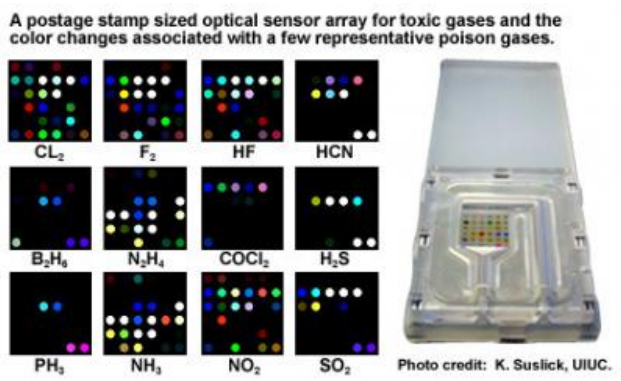
PORTLAND, Ore. — A sensor akin to an electronic nose could be used to detect toxic industrial chemicals and be as commonplace as radiation badges around nuclear facilities, according to the the National Institute of Environmental Health Sciences (NIEHS).

NIEHS, part of the National Institutes of Health, funded research at the University of Illinois at Urbana-Champaign, where investigators created disposable badges used in detecting toxic chemicals.

Professor Kenneth Suslick used optoelectronics technology to create an artificial nose that detects a range of known toxic industrial chemicals. The sensor works by glowing a different color when detecting specific toxins. The 36-color sensor array also will display a unique pattern of color change for a mix of toxins, permitting a library of color fingerprints to be cataloged. These can be used to identify both common and uncommon exposure.



A postage stamp-sized optical sensor array for detecting industrial toxins is said to be able to identify toxins and displaying color changes associated with representative poison gases.

Source: Kenneth Suslick, University of Illinois at Urbana-Champaign.

The colorimetric sensor array detects a wide range of volatile analytes using a disposable array of cross-responsive nanoporous pigments. Colors change in response to complex sets of chemical reactions, revealing the fingerprint of the toxic substance detected.

In a recent test to prove the feasibility of its approach, Suslick's team tested the sensor against 19 typical toxic industrial chemicals in concentrations known to be harmful to humans, including ammonia, chlorine, nitric acid and sulfur dioxide. After exposure for just 2 minutes, the electronic nose identified the most noxious samples.

The prototype used a flat-bed scanner to read color patterns on the exposed badges. A computer then matched the results against a library of known toxins. The researchers are next developing a handheld prototype which uses white LEDs for illumination and a digital camera to scan the array and submit files to an algorithm. The algorithm identifies the colors and matches them to known toxins.

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