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NEWS

Does the Nose Always Know?

Researchers at the University of Illinois have developed a technique for discerning odors that is far more sensitive than the human nose and has numerous potential applications in the workplace as well as the home. Ten to 100 times more sensitive than the human nose for many compounds, the artificial nose works by visualizing odors; it is simple, fast, and inexpensive. The technique, termed "smell-seeing" by its inventors, uses an array of vapor-sensitive dyes known as metalloporphyrins that change color when they interact with different chemicals (N. Rakow and K. Suslick, "A colorimetric sensor array for odour visualization," *Nature*, 406:710-3, Aug. 17, 2000). Resulting changes in the array provide a fingerprint unique to each vapor with color intensity indicative of chemical concentration. To create an array, the researchers paint a series of different dye dots on an inert backing such as paper, plastic, or glass. Researchers scan the array with an ordinary flatbed scanner or an inexpensive electronic camera before and after exposure to an odor-producing substance. Subtracting the 'before' image from the 'after' image produces the color-change pattern of the odorant; that is compared to a library of color fingerprints to identify and quantify the chemical compounds. According to **Kenneth S. Suslick**, the William H. and Janet Lycan Professor of Chemistry at the UI, "Most factors associated with the technique are not new--metalloporphyrins are well-studied, the dyes are readily accessible, and the imaging could have been done with filters and film before the days of digital cameras and scanners. The fact that a specific aroma would give a specific color pattern was more than a little iffy." Artificial nose applications include the evident: toxic gas detection in the defense sector; worker exposure monitoring in the chemical, petroleum and pharmaceutical industries; flavoring detection in the food industry; and airport contraband detection. Less obvious applications include refrigerator content spoilage detection and microwave or conventional oven cooking-completion monitoring.

--Kate Devine

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