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Latest News

August 23, 2005

MOLECULAR RECOGNITION



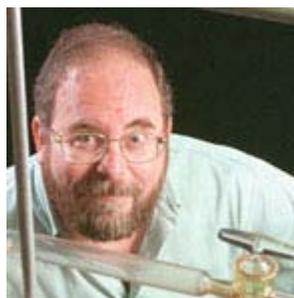
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Array Takes A Drink

Sensor array uses simple components to generate fingerprints for organics in complex beverages

[CELIA HENRY](#)

A convenient tool may be at hand to meet the challenges of characterizing complex mixtures in water. A simple and easy-to-use sensor array has been developed by chemistry professor [Kenneth S. Suslick](#) and grad student Chen Zhang at the University of Illinois, Urbana-Champaign, for various applications such as quality control of beverages (*J. Am. Chem. Soc.* **2005**, *127*, 11548).



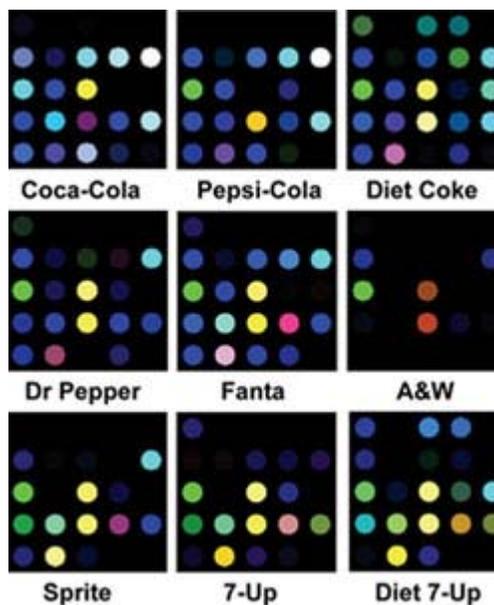
Suslick

PHOTO BY BILL WIEGAND/UIUC

The array consists of a hydrophobic surface spotted with 36 commercially available dyes that respond to different chemical properties. For example, metalloporphyrins respond to Lewis bases, and solvatochromic dyes provide a measure of analyte polarity. The rest of the array contains traditional pH indicators, which actually tell much more about the samples than just pH. "At this point, the array is truly universal," Suslick says. "It isn't necessary to tweak the choice of dyes for one application or another."

After the array is exposed to the aqueous mixture, Zhang and Suslick take an image of it at the three colors (red, green, blue) of a simple flatbed scanner, the kind used for turning photos into digital images. By subtracting a background image, they generate a color change profile that is essentially a fingerprint for each sample. Using the array, they distinguished a variety of soft drinks, as well as aqueous solutions with single components.

The array gives a signature for the complex mixture and doesn't identify individual components. Suslick and Zhang are using the array to distinguish other types of beverages, such as coffee and tea. "One seldom actually cares what the different components in a cup of coffee are," Suslick says. The real question is the quality of the overall mixture. "Those judgments are better made by a composite response than by individual component responses."

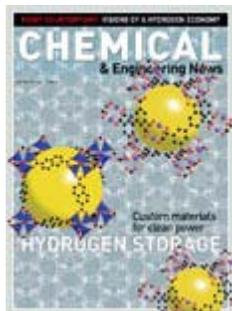


DOTTY Color change profiles from sensor arrays with 36 dyes show clear differences between different brands of soft drinks.

COURTESY OF KEN SUSLICK

The researchers will describe their work in poster sessions sponsored by the Division of Analytical Chemistry and the Academic Employment Initiative during the American Chemical Society national meeting next week in Washington, D.C.

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