

Research Highlights

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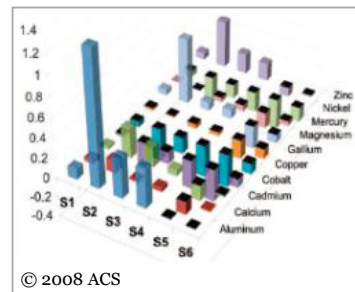
Metal ion detection: A sensor with discerning taste

Neil Withers

The fingerprint response of conjugated chromophores enables optical discrimination between 10 metals

The potential impact of metal ions — be they naturally occurring or as a result of pollution — on human health and the environment is large. One particular example is that of the widespread element aluminium, which has been linked to Alzheimer's disease. It is no wonder, therefore, that increasingly sensitive methods are being developed to detect a range of metal ions.

Now, Pavel Anzenbacher and colleagues at Bowling Green State University, Ohio, have combined¹(#B1) the same 8-hydroxyquinoline receptor with various conjugated chromophores to create sensor arrays for metal ion detection. Not only does the fluorescence of the chromophore part of the sensor change when a metal ion binds to the receptor portion of the molecule, but the fluorescence properties of the newly formed metalloquinolinolate are also affected. The system delicately balances conjugation, fluorescence enhancement, energy transfer and a metal quenching effect to give a fingerprint-like response to each sensor–cation pair. An array of six sensor molecules was created and used to detect 10 metal cations in water with 100% accuracy.



Anzenbacher and colleagues found that by using sophisticated pattern-recognition techniques they could use just one sensing molecule to give almost the same level of discrimination as the full array. The practical potential of the technique was demonstrated by using analyte samples taken directly from seven commercially available soft-drink bottles. The metals present in each beverage were detected without pretreatment, enabling the identity of each drink to be determined.

REFERENCE

1. Palacios, M. A., Wang, Z., Montes, V. A., Zyryanov, G. V. & Anzenbacher, P. Jr Rational design of a minimal size sensor array for metal ion detection. *J. Am. Chem. Soc.* doi: 10.1021/ja802377k (2008). | [Article \(http://dx.doi.org/10.1021/ja802377k\)](http://dx.doi.org/10.1021/ja802377k) |