

Shining new light on air pollutants using entangled porous frameworks

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Certain types of pollution monitoring may soon become considerably easier. A group of researchers centered at Kyoto University has shown in a recent *Nature Communications* paper that a newly-formulated entangled framework of porous crystals (porous coordination polymers, or PCPs) can not only capture a variety of common air pollutants, but that the mixtures then glow in specific, easily-detected colors.

Until now, chemical sensors have generally needed to be custom-designed to recognize specific compounds, and a separate transmission mechanism was required in order to "see" that a particular molecule had indeed been successfully captured.

"We have created what amount to be interlocking jungle-gyms, that move relative to each other and are therefore able to capture molecules of varying sizes," explained Dr. Shuhei Furukawa of Kyoto University's Institute for Integrated Cell-Material Sciences (iCeMS).

This naphthalenediimide-based PCP, known as NDI, expands and contracts to confine air-born [volatile organic compounds](#) (VOCs) such as [benzene](#), toluene, xylene, anisole, and iodobenzene, which are common pollutants in the lower atmosphere.

"When exposed to [ultraviolet light](#), the NDI-VOC interaction luminesces in an unusually wide range of colors, sufficiently intense to be observed even with the naked eye," elaborated iCeMS Professor and deputy director, Susumu Kitagawa.

These findings, including contributions from Dr. Virginia Martínez Martínez at the Universidad del País Vasco in Bilbao, open the door to the development of a new range of portable, solid-state pollution detectors, and possibly even new types of light sources.

Lead author for the paper was Dr. Yohei Takashima.

More information: The article, "Molecular decoding using luminescence from an entangled porous framework" by Yohei Takashima, Virginia Martínez Martínez, Shuhei Furukawa, Mio Kondo, Satoru Shimomura, Hiromitsu Uehara, Masashi Nakahama, Kuniyisa Sugimoto, and Susumu Kitagawa was published online in the January 25, 2011 issue of *Nature Communications*.

Provided by Kyoto University

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