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**Institute for Integrated Cell-Material Sciences (iCeMS)  
Kyoto University**

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FOR IMMEDIATE RELEASE

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# News Release

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## Shining New Light on Air Pollutants Using Entangled Porous Frameworks

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. Lead author for the paper was Dr. **Yohei Takashima**.

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. **Shuheï 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.

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Dr. Yohei Takashima



Dr. Virginia Martínez Martínez



Dr. Shuheï Furukawa



Dr. Susumu Kitagawa



"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.

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### About the iCeMS:

The Institute for Integrated Cell-Material Sciences (iCeMS) at Kyoto University in Japan aims to advance the integration of cell and material sciences -- both of which are traditionally strong fields for the university -- by creating a uniquely innovative global research environment. The iCeMS seeks to integrate the biosciences, chemistry, materials science, and physics to capture the potential power of meso-scale control of stem cells (e.g., ES/iPS cells) and soft functional architectures (e.g., porous coordination polymers). Such manipulation holds the promise of significant advances in medicine, pharmaceutical studies, the environment, and industry.

### Publication information

#### Molecular decoding using luminescence from an entangled porous framework

Yohei TAKASHIMA, Virginia MARTINEZ MARTINEZ, Shuhei FURUKAWA, Mio KONDO, Satoru SHIMOMURA, Hiromitsu UEHARA, Masashi NAKAHAMA, Kuniyoshi SUGIMOTO, Susumu KITAGAWA

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### Funding sources

- Japan Science and Technology Agency (JST)
- Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT)

### Also available at

- Kyoto University website:  
[www.kyoto-u.ac.jp/en/news\\_data/h/h1/news6/2010/110126\\_1.htm](http://www.kyoto-u.ac.jp/en/news_data/h/h1/news6/2010/110126_1.htm)
- EurekAlert! by AAAS:  
[www.eurekalert.org/pub\\_releases/2011-01/ific-snl012311.php](http://www.eurekalert.org/pub_releases/2011-01/ific-snl012311.php)