Platinum nanostructure sensor can differentiate mirror-image volatile scent compounds

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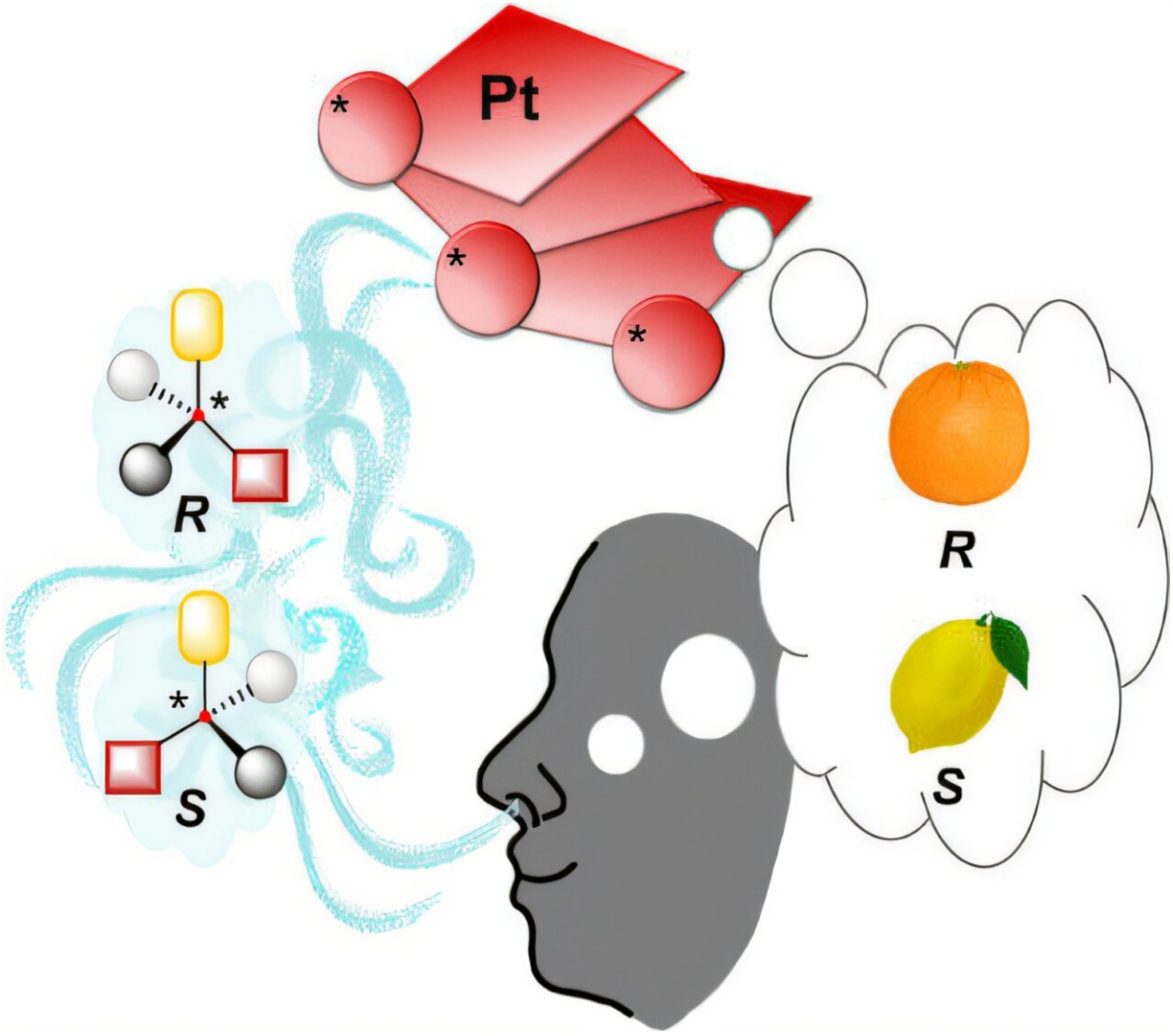

Graphical Abstract. Credit: *Angewandte Chemie International Edition* (2026).

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Terpenes are volatile organic compounds that are responsible for, among other things, the typical scents of plants, resins or citrus fruits. These compounds occur naturally in the environment and influence chemical processes in the atmosphere. At high concentrations, they can irritate the respiratory tract and contribute to the formation of harmful derivatives. Many terpenes exist in two mirror-image forms, known as enantiomers, which can differ significantly in terms of their effects and how they are perceived—but which are difficult to distinguish between using technical means.

Platinum-based nanostructures as sensors

Now, researchers from the Department of Chemistry at the University of Basel have presented a new approach that allows these mirror-image forms of the molecules to be detected specifically.

"Our work focused on a specially developed platinum-based molecule that works as a sensor," explains Dr. Annika Huber, first author of the study and a former doctoral student at the Swiss Nanoscience Institute's Ph.D. School. "This sensor molecule has a fixed, three-dimensional shape and aggregates with a large number of identical molecules to form tiny stack-like nanostructures that react differently to the two mirror-image forms of the terpenes."

When volatile molecules interact with the sensor, the arrangement of the platinum molecules changes—and this response differs depending on which enantiomer is present. The researchers were able to measure this difference based on the absorption of specific wavelengths of light in the ultraviolet and visible region.

At the same time, the change in the sensor molecule can also be reversed. Once the scent compounds are removed, the molecule returns to its initial state and can be used again.

Suitable also for detecting nonpolar and unfunctionalized molecules

The study, which was recently published in the journal *Angewandte Chemie*, shows that the method can be used to differentiate various volatile compounds, including alcohols and some terpenes. "Most notably, we succeeded in differentiating nonpolar and unfunctionalized molecules, which cannot be detected using many conventional sensors," says Professor Oliver Wenger, who supervised the work together with Professor Christof Sparr.

The new approach therefore provides a basic functional principle for future sensor systems that could work as an "artificial nose." Systems of this kind would have potential applications in environmental analysis, quality control or the investigation of atmospheric processes—without the need for elaborate measuring equipment.

More information: Annika Huber et al, Enantiospecific Optical Sensing of Terpenes by an Aggregated Atropisomeric Platinum(II) Complex, *Angewandte Chemie International Edition* (2026). DOI: 10.1002/anie.202523522

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