A3-11 Chemosensor Arrays for Aqueous Environments: A Supramolecular Approach

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The cross-reactive receptors of the mammalian olfactory systems allow the detection of multiple odorant molecules simultaneously. The obtained recognition information is data-processed, resulting in the discrimination of odor based on pattern recognition. Such sophisticated recognition fashions in *Mother Nature* are promising designs for powerful pattern recognition-driven chemical sensing.[1] Real samples such as body fluids, foods and drinks, and environmental water contain various invisible analytes with different structural geometries, sizes, and charges. Therefore, efficient receptor designs are required, considering the above features of analytes in real-sample analysis. Biogenic receptors, including enzymes and antibodies, are the representative materials that allow selective recognition against specific analytes, based on the lock-and-key models. Meanwhile, synthetic receptors are designed by molecular recognition chemistry, which offers superior cross-reactivity to selective recognition.[2]

Chemosensors comprising synthetic receptors and indicators enable visualization of analyte recognition information through changes in colorimetric and/or fluorescent properties (Fig. 1(a)). Chemosensors on an array show various optical properties depending on the types of analytes and their concentrations, which are referred to as fingerprint-like responses. With pattern recognition techniques, optical chemical information can be visualized qualitatively and quantitatively. In this regard, molecular self-assemblies serve as driving forces for obtaining various optical patterns derived from assembly and disassembly in chemical sensing (Fig. 1(b)).[3), 4)] To date, the author has developed self-assembled chemosensors for pattern recognition and revealed the applicability of this concept to various chemical sensing in water environments.[4)] The strategies for chemosensor designs based on molecular self-assembly for multi-component analysis will be introduced in the presentation.

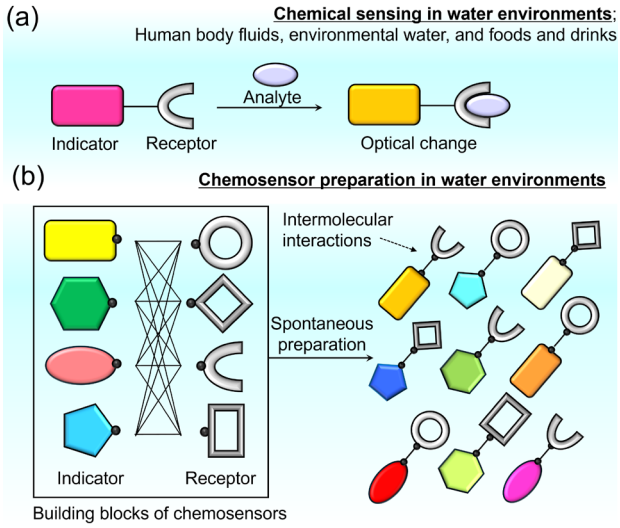

Fig. 1 Conceptual illustration of (a) a typical chemosensor for analyte capture in water environments and (b) the spontaneous preparation of self-assembled chemosensors in water.

1）Y. Sasaki et al., *Coord. Chem. Rev*. **2021**, *429*, 213607.
2）Y. Sasaki et al., *ChemNanoMat* **2024**, *10*, e202300335 (**Cover**).
3）Y. Sasaki et al., *Chem. Sci*. **2020**, *11*, 3790 (**Cover, Hot Article**).
4）Y. Sasaki et al., *Chem. Commun*. **2025**, *61*, 476 (**Cover**).

PROFILE

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[1] Yui Sasaki received her Ph.D. from the University of Tokyo in 2020. From 2018 to 2021, she served as a JSPS Research Fellow for Young Scientists (DC1) and JSPS postdoctoral fellow (PD) at the University of Tokyo. She worked as a Project Researcher between 2021 and 2022 and was promoted to a Project Research Associate at the same university. Subsequently, she was appointed as a Lecturer in 2024. [2] Her interests include self-assembled functional materials. [3] 2023 PCCP Prize (The Chemical Society of Japan) and Young Researcher Support For Attending Lindau Nobel Laureate Meetings (JSPS) [4] Materials Nanoarchitectonics [5] Website: https://www.sayui.rcast.u-tokyo.ac.jp/en/