# Synthesis and Phase Transition Behaviors of Flexible Calcium Coordination Polymers


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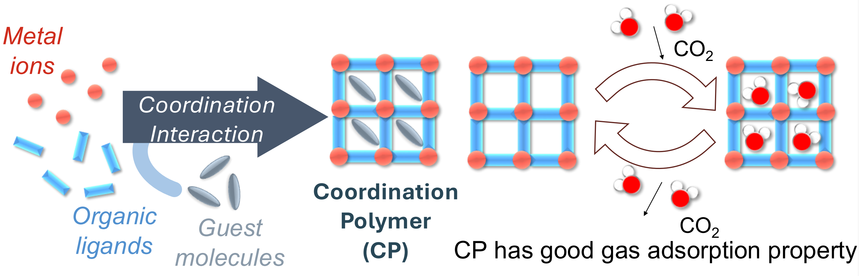
## 未来社会のあるべきかたち

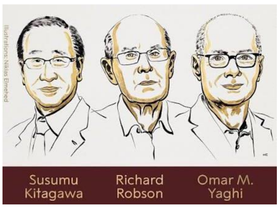
- A sustainable society supported by innovative functional materials
- Climate action through $CO_2$-responsive adsorption and separation technologies
- Low-environmental-impact material design using abundant light metals

## Background



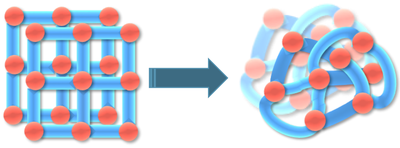

CP has good gas adsorption property

### Recent achievement of CP




**CP (or called as MOF) win the Nobel chemistry prize in 2025!**

### What's the benefits for glass CP?




- Glass state could avoid defects and give high processability.

## Research Target

*Low cost, high abundance, and high biocompatibility*

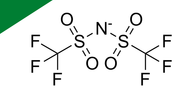
Light metal

$Ca^{2+}$

Component selection

Final target

**Flexible Calcium** coordination polymer with **phase transition** behavior



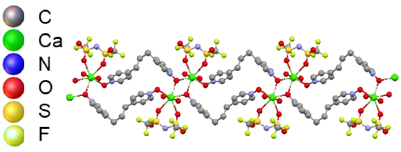
Bis(trifluoromethane sulfonyl)imide($NTf_2^-$)

*Flexible structure*

1,3-bis(4-pyridyl)propane-*N*,*N*'-dioxide (bppdo)

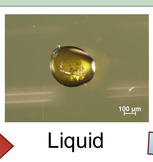
*Flexible structure, good affinity to light metal*

## Crystal structure




1D chain structure

## Phase transition property

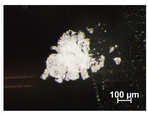


Liquid

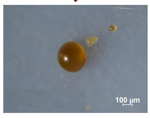
Heating

Quenching

**Phase Transition**



Crystal



Glass

Phase transition process could be directly observed by eye.

## Future potential application

Architecture

House window
$CO_2$ adsorb

Agriculture

Greenhouse
$O_2$ induce

Manufacture

Gas/liquid purification