

# Anion-directed chemistry of functional solid-state materials



Keywords: Inorganic solid state materials, mixed anion, high pressure synthesis, low-T reactions

Yoshihiro Tsujimoto

Quantum Materials Field / Quantum Solid State Materials Group

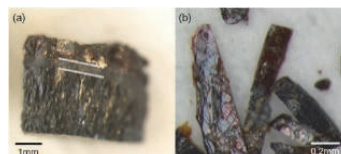
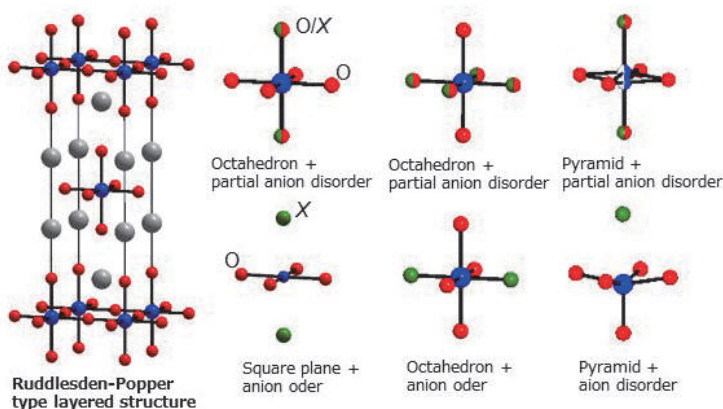
TSUJIMOTO.Yoshihiro@nims.go.jp | [https://samurai.nims.go.jp/profiles/tsujimoto\\_yoshihiro](https://samurai.nims.go.jp/profiles/tsujimoto_yoshihiro)



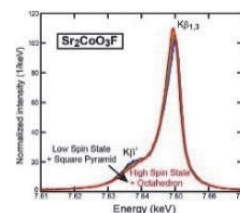
**Background** A number of solid state materials such as oxides and sulfides have been utilized in electronic, optical or electrochemical, or thermoelectric devices. Recently, mixed anion materials with additional degree of freedom in anion lattices or compositions have drawn much attention because of their novel functionality.

**Aim** Electronic states in materials like oxides are correlated with the metal-ligand interactions. In my research, new physical and functional properties have been explored on the basis of anion-directed chemistry, using high-pressure methods, low-temperature reactions, or flux crystal growth techniques.

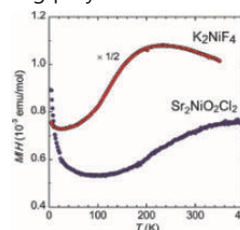
## Advanced Research Topics



Single crystal growth under high pressure



Pressure-induced spin crossover involving polyhedral transformation



Enhanced low-dimensionality

- Synthesis of new mixed anions
- Controlling of anion order in layered structures with different anion sites
- New functional properties derived from novel mixed anion ordered arrangement

## Publications

- Y. Kobayashi, Y. Tsujimoto, H. Kageyama, Annu. Rev. Mater. Res. 48 (2018) 303.
- Y. Tsujimoto et al., Sci. Rep. 6 (2016) 36253.
- Y. Tsujimoto et al., Chem. Commun. 50 (2014) 5915.

## Summary

- Control of metal-centered coordination by anion directed chemistry
- Single crystal growth and new electronic states under high pressure

## Research outcome

- I will further explore and develop single crystal growth and functional properties in terms of practical application, based on the experimental results I obtained.