

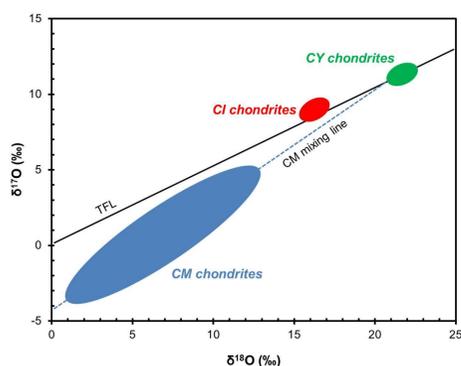
Introducing the CY chondrites

- Y-82162 (C1/2_{ung}), Y-86720 (C2_{ung}) & B-7904 (C2_{ung}) have unique mineralogy, textures & elemental compositions [1].
- Low temperature (<100°C) aqueous alteration followed by thermal metamorphism (>500°C).
- Ikeda [1] proposed a new **CY (Yamato) chondrite group!**
- Other candidates include Y-86789 (C2_{ung}), Y-86029 (C11) & Y-980115 (C11).

Why CY?

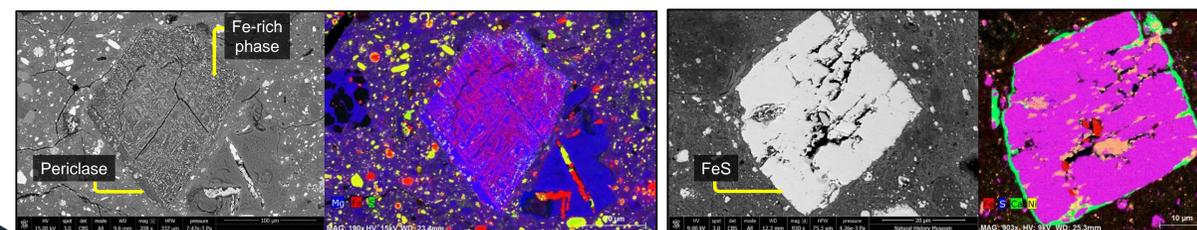
- Isotopic composition, mineralogy and petrography suggest that Y-82162 (C1/2_{ung}), Y-86720 (C2_{ung}), B-7904 (C2_{ung}), Y-86789 (C2_{ung}), Y-86720 (C2_{ung}), Y-86029 (C11) & Y-980115 (C11) form a single group (the CYs!) that is distinct from other carbonaceous chondrites.
- All of these meteorites experienced aqueous alteration & at least one metamorphic event.
- Reflectance spectra are very similar to low albedo, C-type asteroids → are CY-like materials widespread throughout the solar system?

Isotopic Composition of CY Chondrites



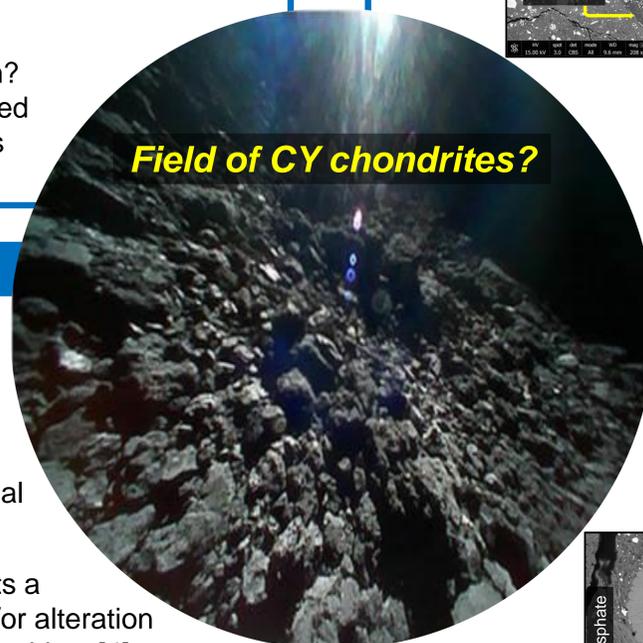
- Oxygen isotopic compositions of Y-82162, Y-86720 & B-7904 **heavier than any other chondrite groups.**
- $\delta^{17}\text{O} \sim 12\text{‰}$ & $\delta^{18}\text{O} \sim 22\text{‰}$ → above the CI chondrite field & close to the intersection of the terrestrial & CM fractionation lines [2].
- Related to thermal metamorphism? But composition of artificially heated CI & CM chondrites contradict this model [2, 3].

Petrography & Matrix Composition of CY Chondrites

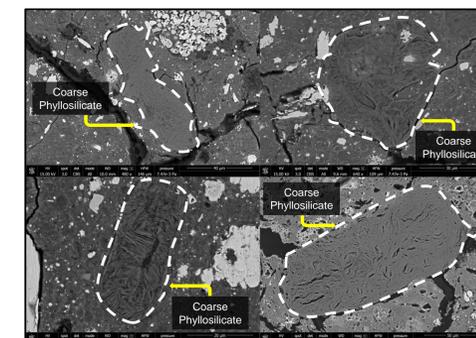


Periclase

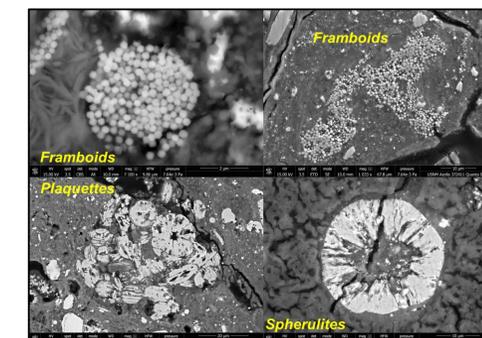
Fe-Ni sulphides



Field of CY chondrites?

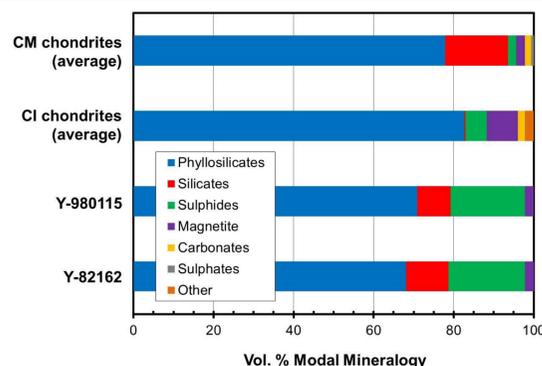


Coarse Phyllosilicates



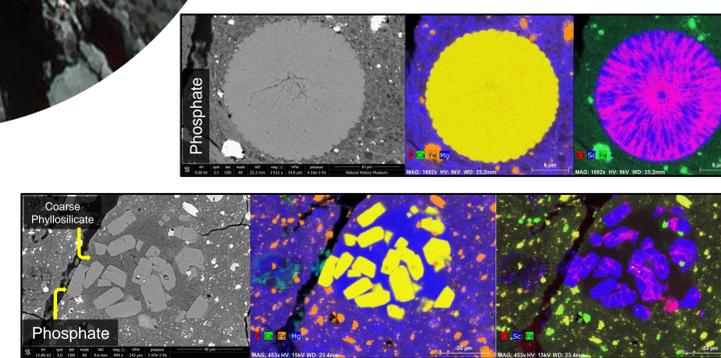
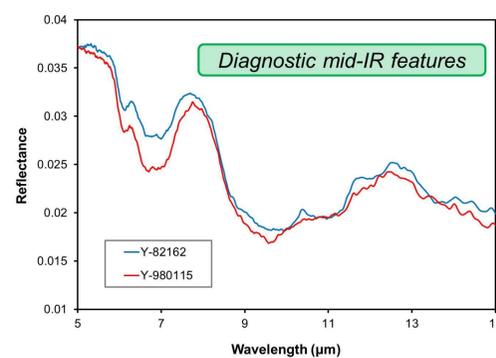
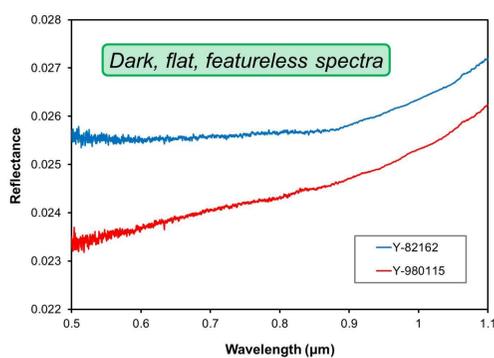
Magnetite

Bulk Mineralogy of CY Chondrites

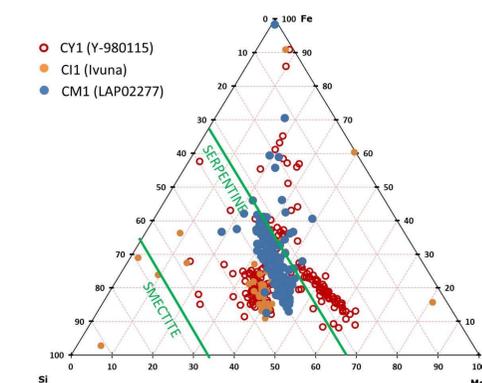


- Y-82162 & Y-980115 contain a highly disordered phase formed via dehydration of phyllosilicates.
- Poorly crystalline olivine & Fe-sulphides formed during thermal metamorphism.
- **Distinct mineralogy** that suggests a different starting composition and/or alteration history to other carbonaceous chondrites [4].

CY Reflectance Spectra Closest Match to Ryugu?



Phosphates



References & Acknowledgements

[1] Ikeda (1992) *Proc. NIPR Symp. Antarct. Meteorites* 5, 49–73. [2] Clayton & Mayeda (1999) *GCA* 63, 2089–2104. [3] Tonui et al. (2014) *GCA* 126, 284–306. [4] King et al. (2015) *GCA* 165, 148–160.

Y-82162 & Y-980115 samples are from the NIPR. Reflectance spectra were collected as part of a EuroPlanet visit to the Planetary Spectroscopy Laboratory at the DLR, Berlin.