2021

The Upper Pressure Stability Field of Marialite

Alexander Kerstanski
Binghamton University--SUNY

The Upper Pressure Stability Field of Marialite

PRESENTER:

Alexander Kerstanski

BACKGROUND:

• Economic mineral deposits of hydrothermal origin are an important source of metals, such as gold, copper, silver, zinc, etc.

• The production of economic minerals typically occurs due to plate tectonics releasing chlorine-bearing fluids many kilometers deep within the Earth. This results in the formation of deposits on the surface of Earth near igneous intrusions and volcanoes

• Sodium chloride helps flux economic mineral production, and marialite ($Na_3Al_3Si_9O_{24}$·NaCl) may transport NaCl to great depths

PURPOSE: Investigate marialite breakdown to jadeite+quartz+halite

METHODS:

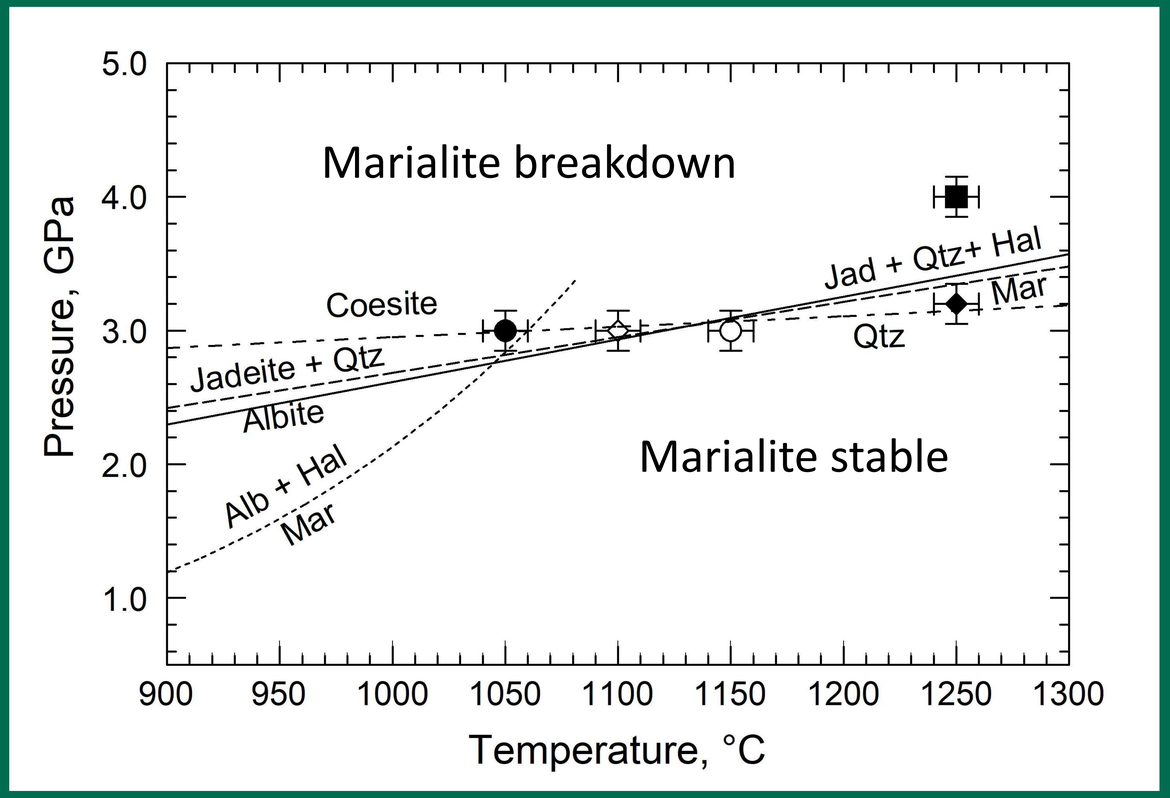
1. Synthesized minerals for a reaction-reversal mixture using a piston-cylinder press
2. Experiments conducted in a multi-anvil press to determine position of the boundary
3. X-Ray diffractometer used to verify results of experiments

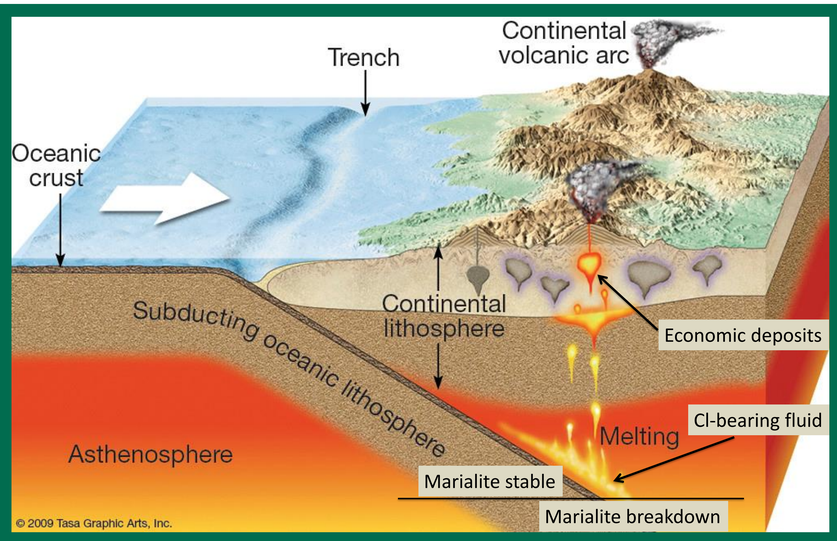
RESULTS:

- The stability field of marialite appears to be approximately 2.8 – 3.6 GPa at 1060 – 1300°C
- 2.8 – 3.6 GPa is the equivalent to depths of 85 – 110 kilometers deep into the Earth

BINGHAMTON UNIVERSITY
STATE UNIVERSITY OF NEW YORK

The growth of **marialite** occurs at depths of **85 – 110 kilometers** and temperatures between **1060 – 1300°C**, most likely fluxing **economic mineral production**.

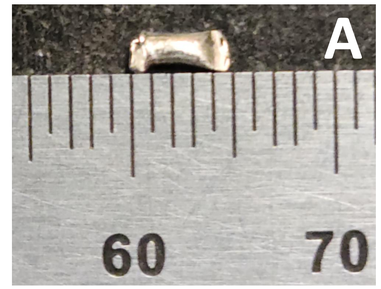


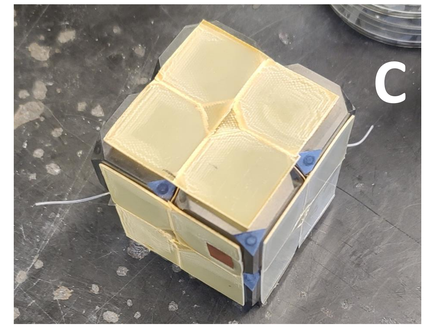


Take a picture to download the full abstract

Materials:

- A = Capsule containing sample
- B = Sample inside octahedral pressure medium of MgO
- C = Carbide-cube pressure assemblage with insulator plates
- D = Multi-anvil press in operation





REFERENCES

https://www.flickr.com/photos/64320116@N08/15828380529