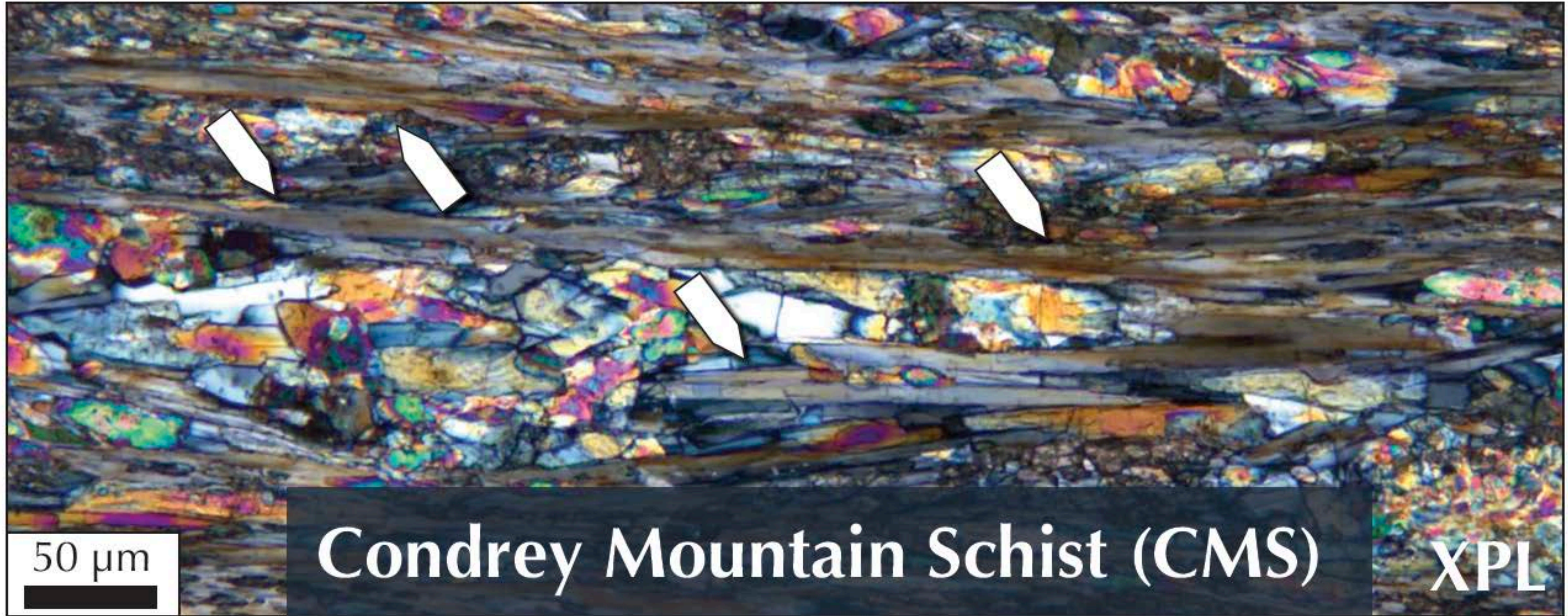


Experimental Investigation of Glaucophane Rheology Through General Shear Deformation Experiments

Lonnie Hufford, Leif Tökle,
Claudio Madonna, and Whitney Behr

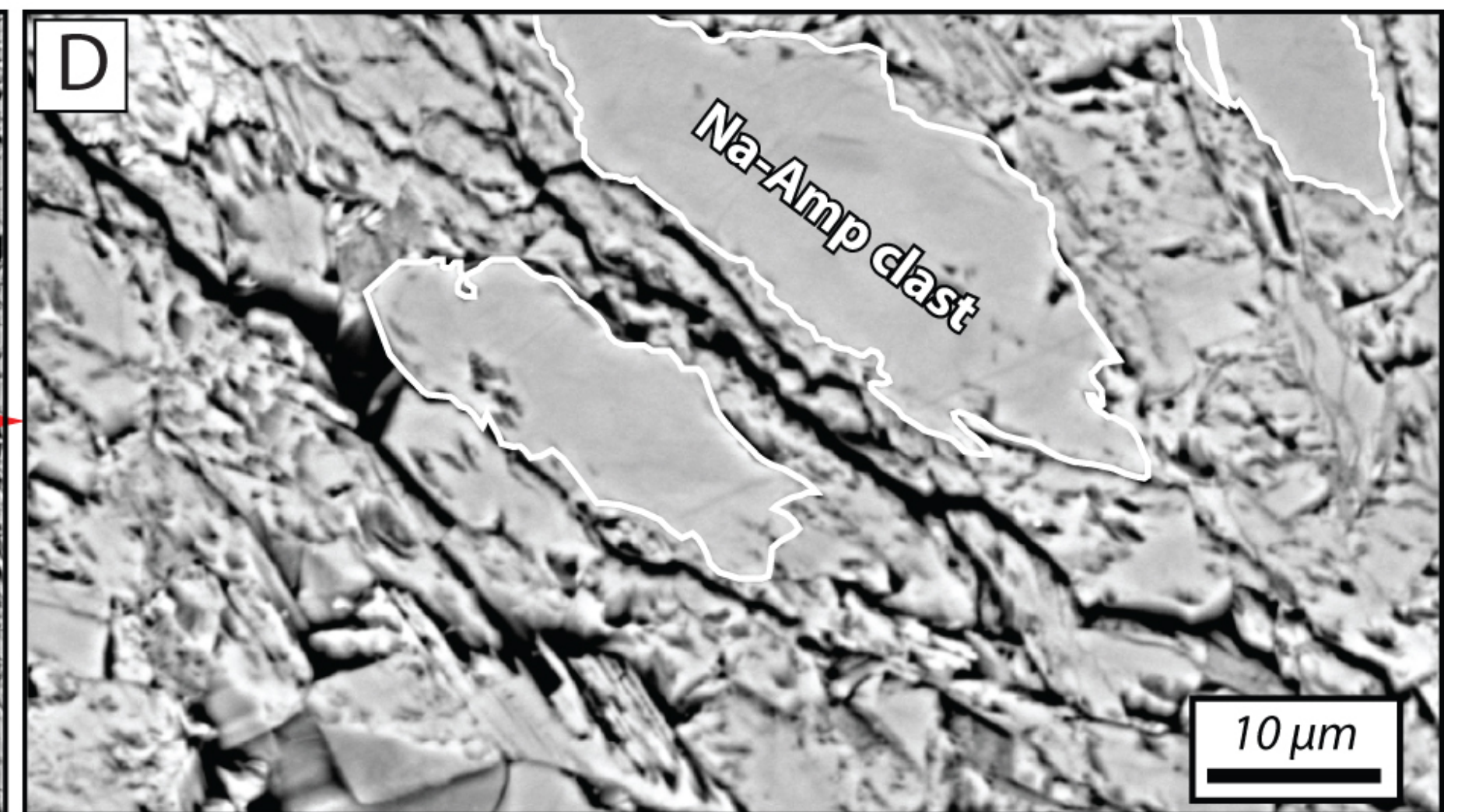
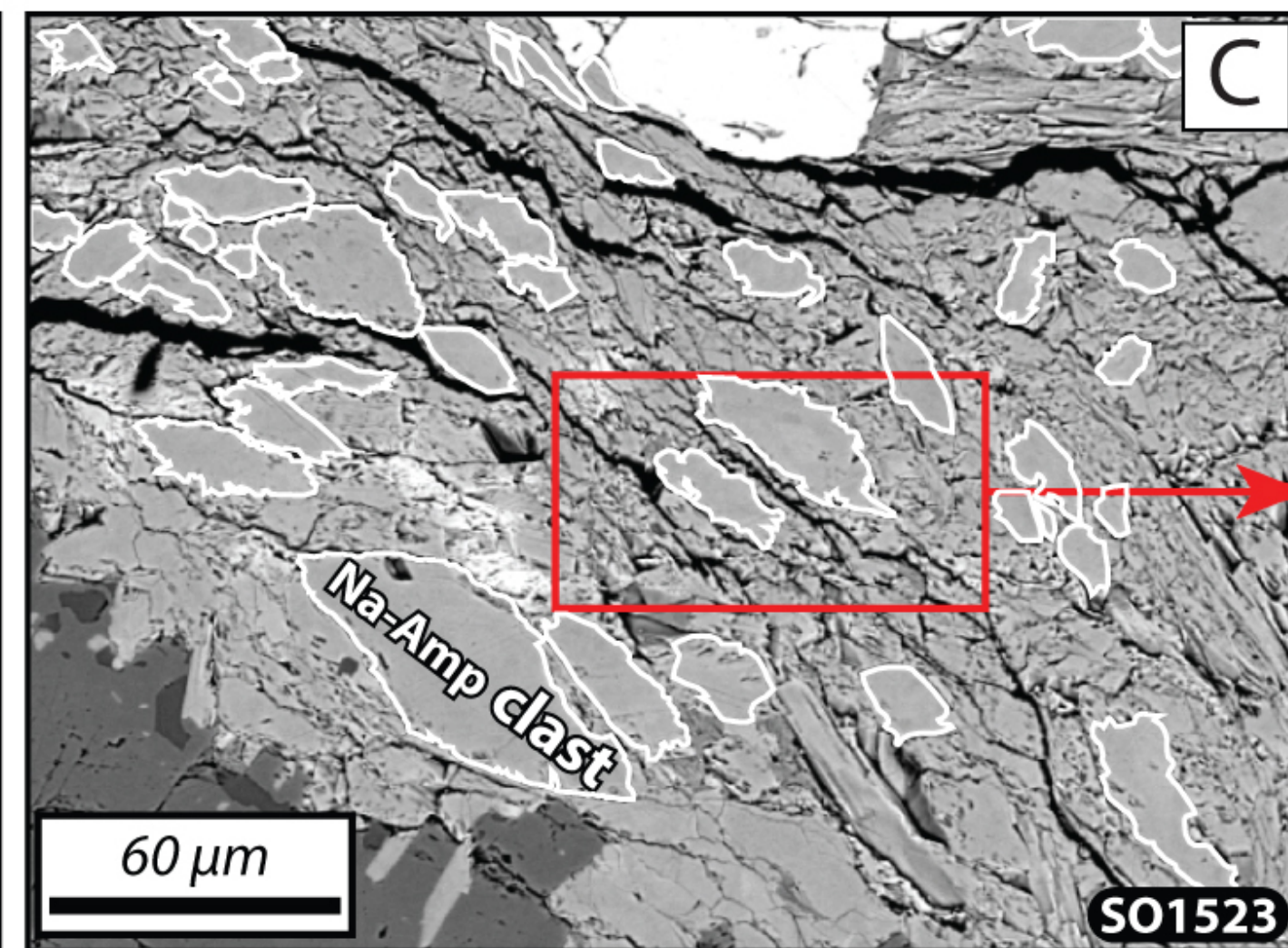
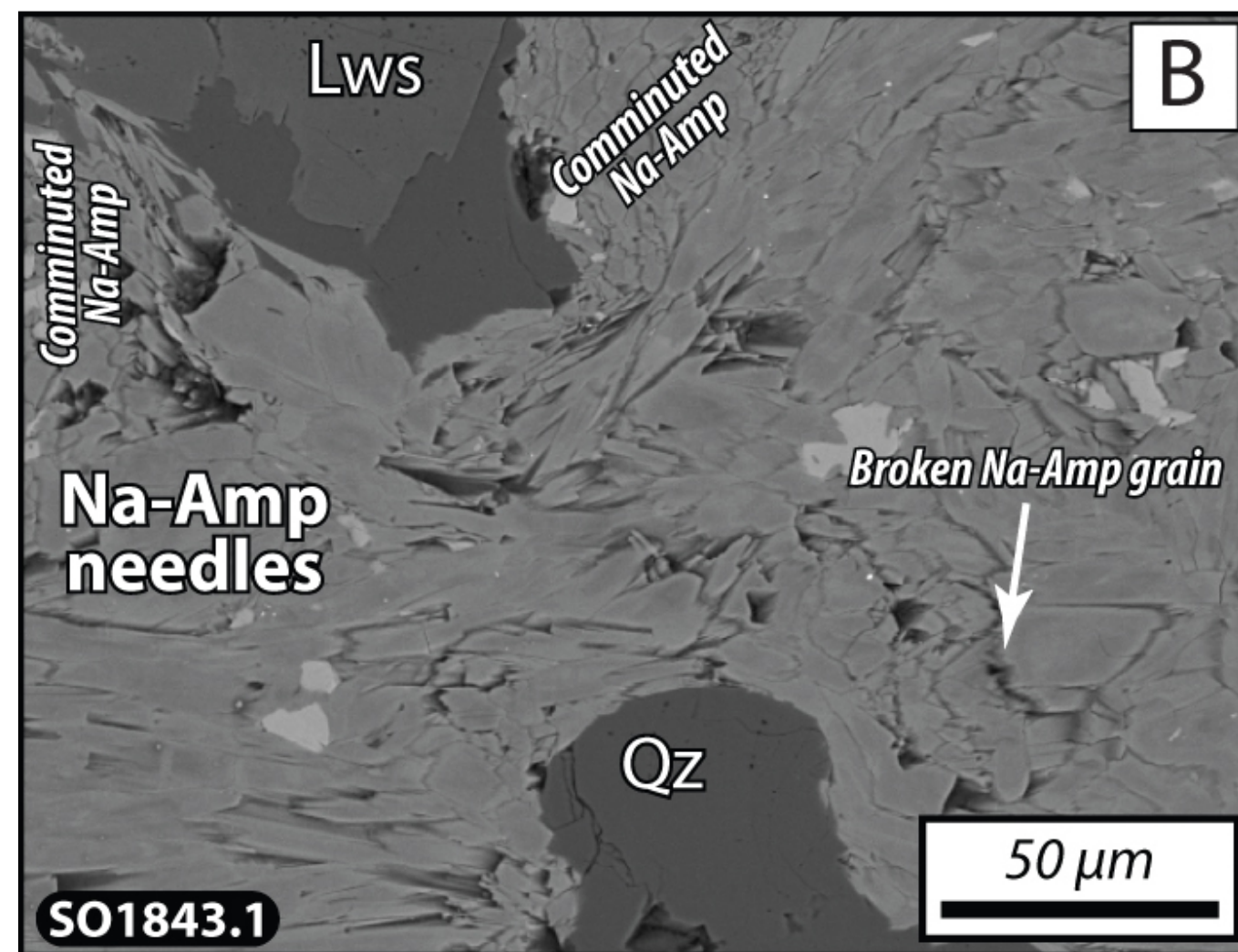
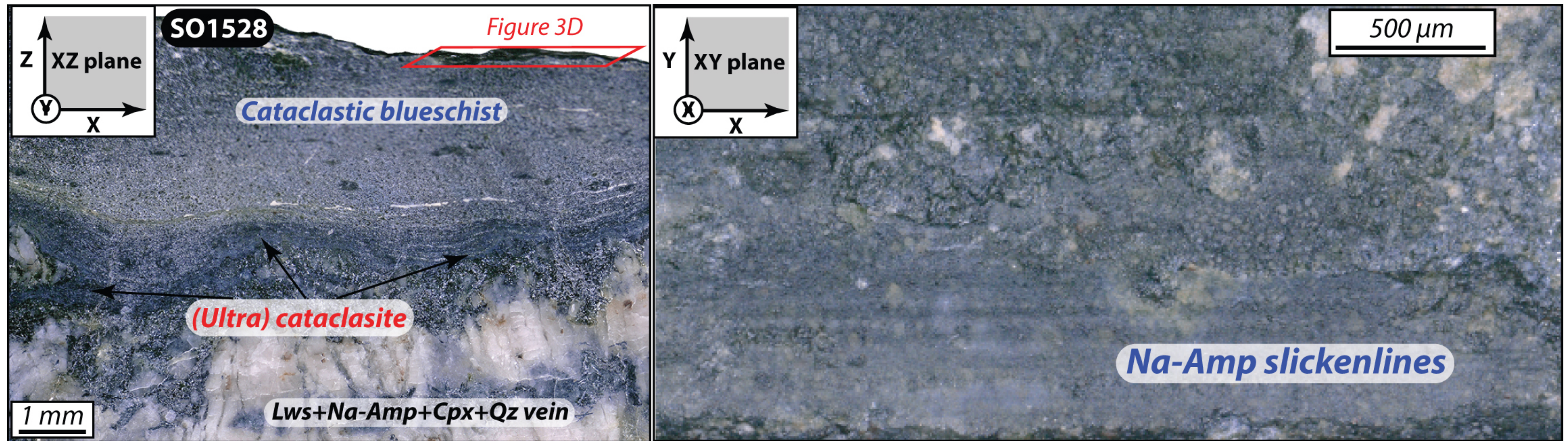


Motivation



Provided by Carolyn Tewksbury-Christle (EGU 2021)

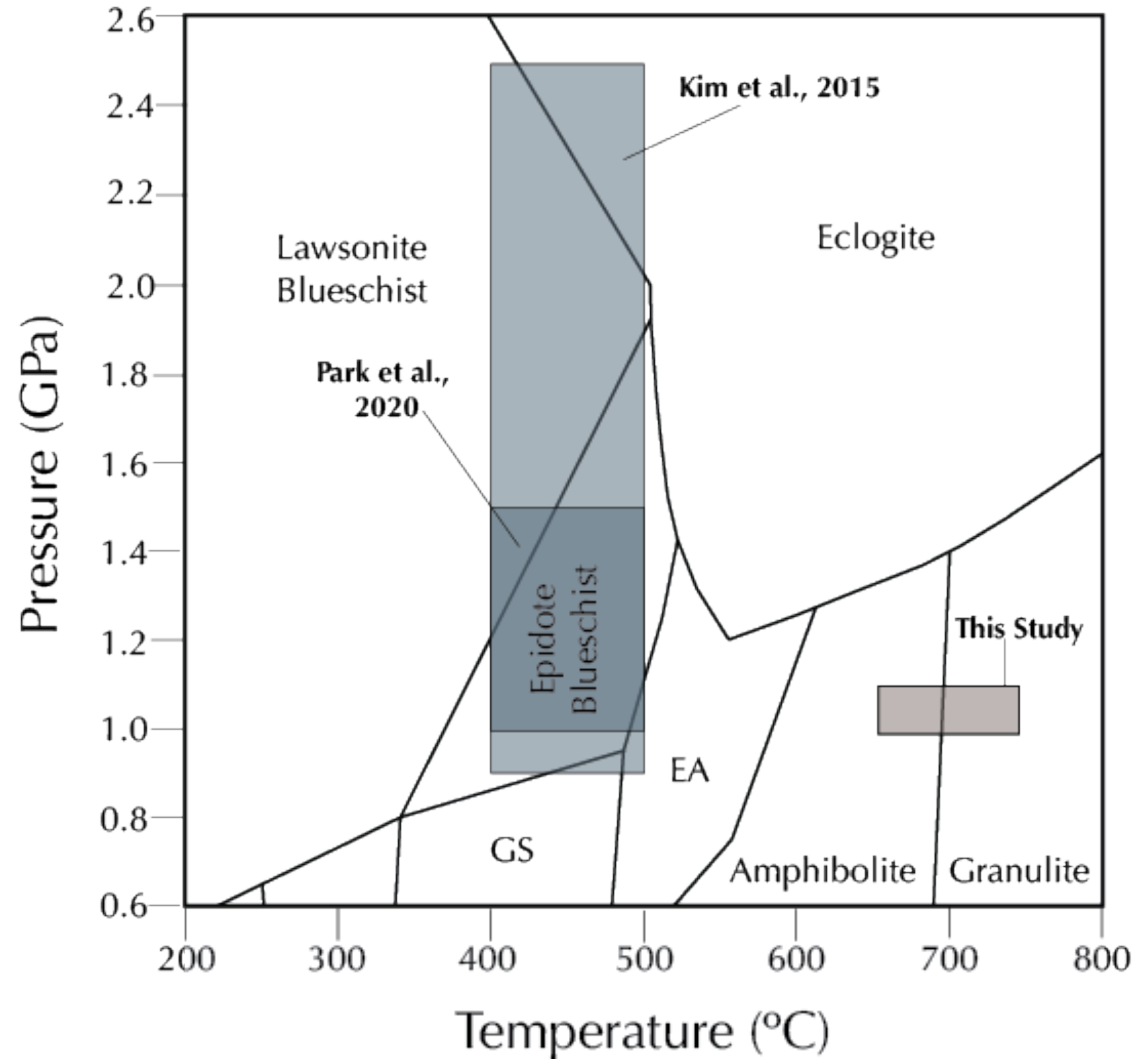
Motivation



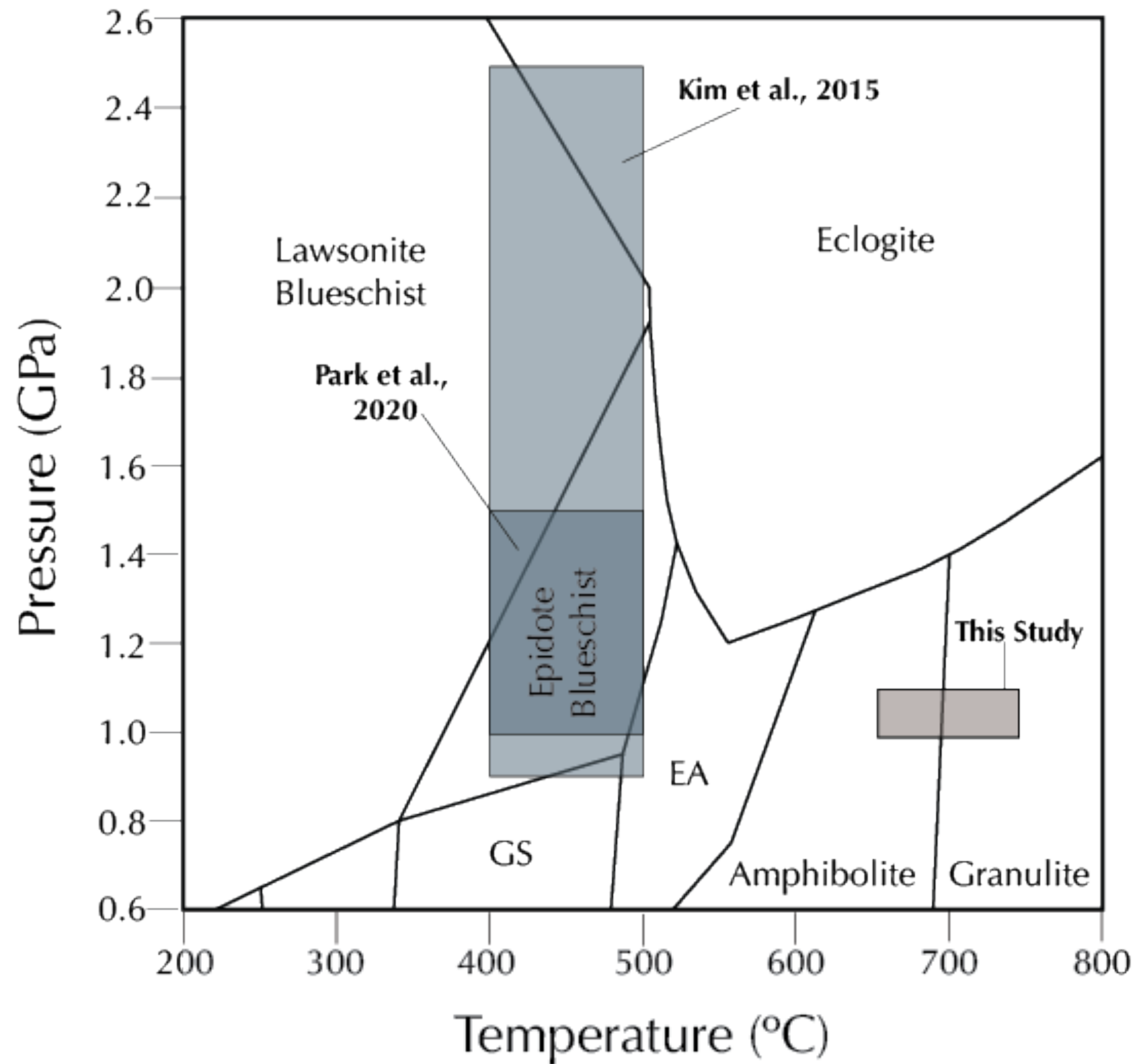
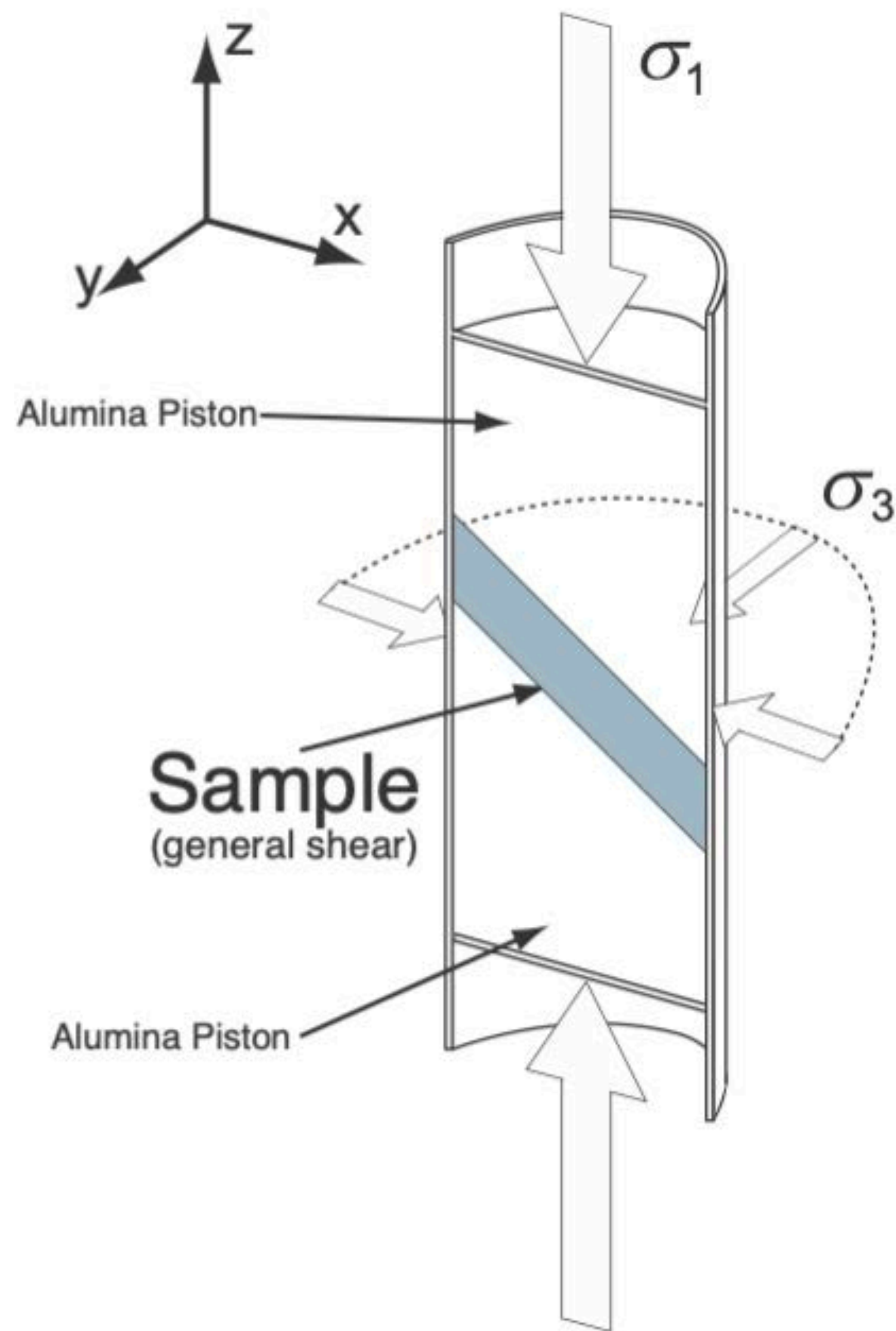
Motivation

Deformation mechanisms?

Rheological properties?



Motivation



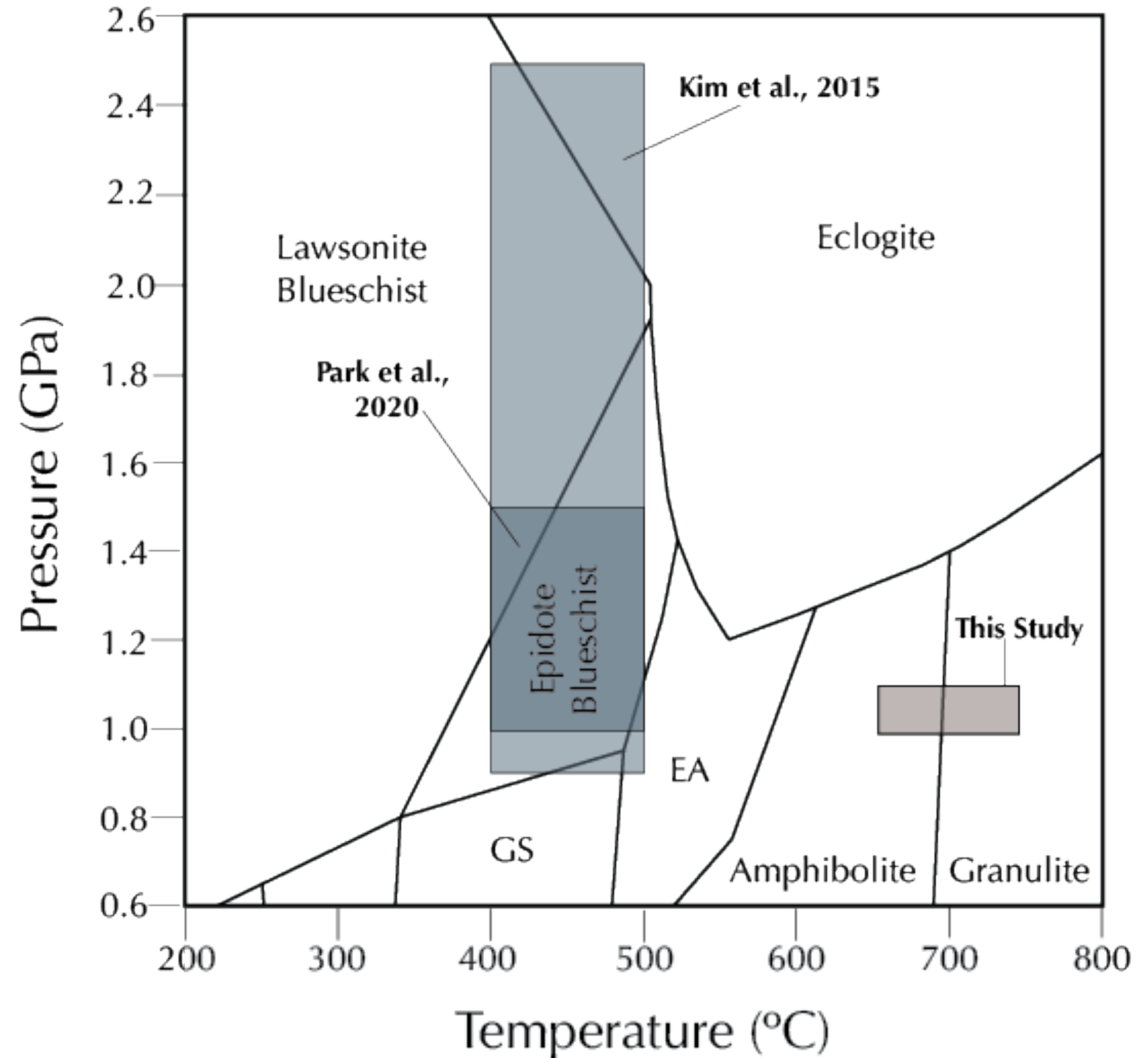
Key Objectives

Glaucophane:

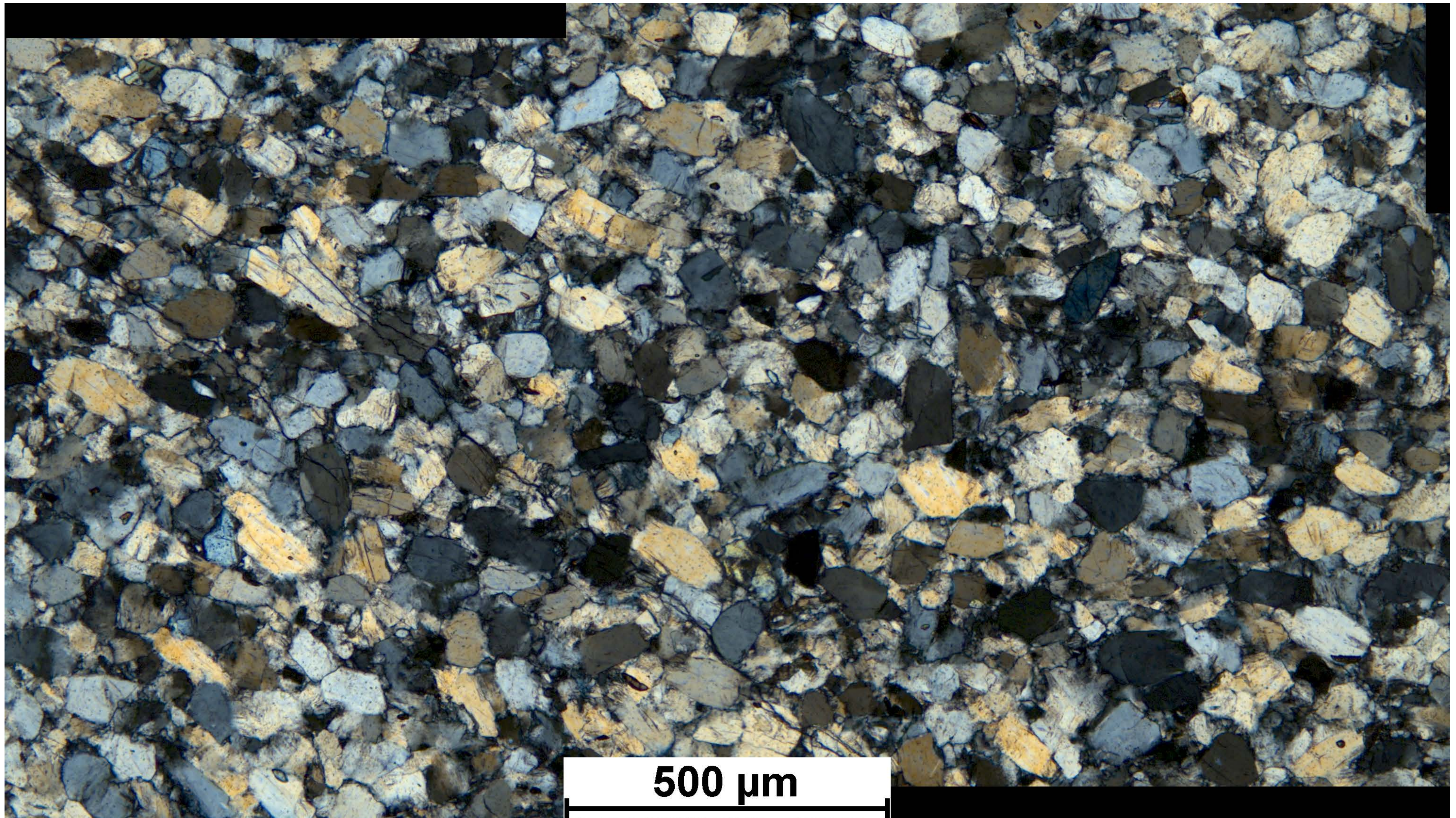
- *Characterise deformation* ✓
- *Constrain rheological properties*

Results:

- *Transect of temperature effect at:*
 - *1.0 GPa*
 - *$\sim 3.6 \times 10^{-6}$ shear strain rate*

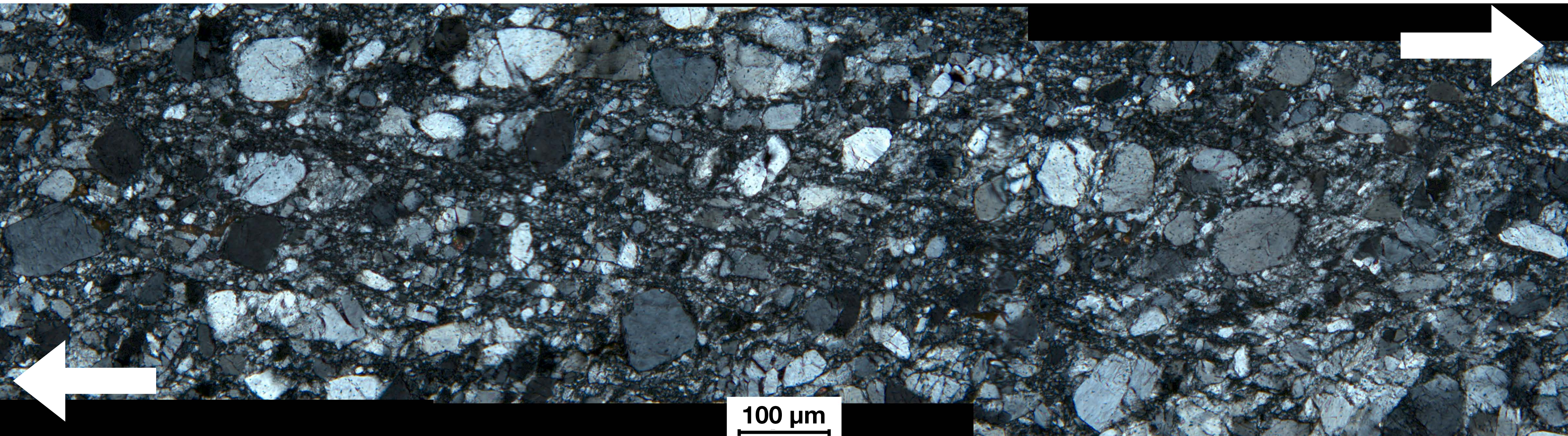


Starting Material 700°C|1.0 GPa|75-90 μm



Brittle Deformation

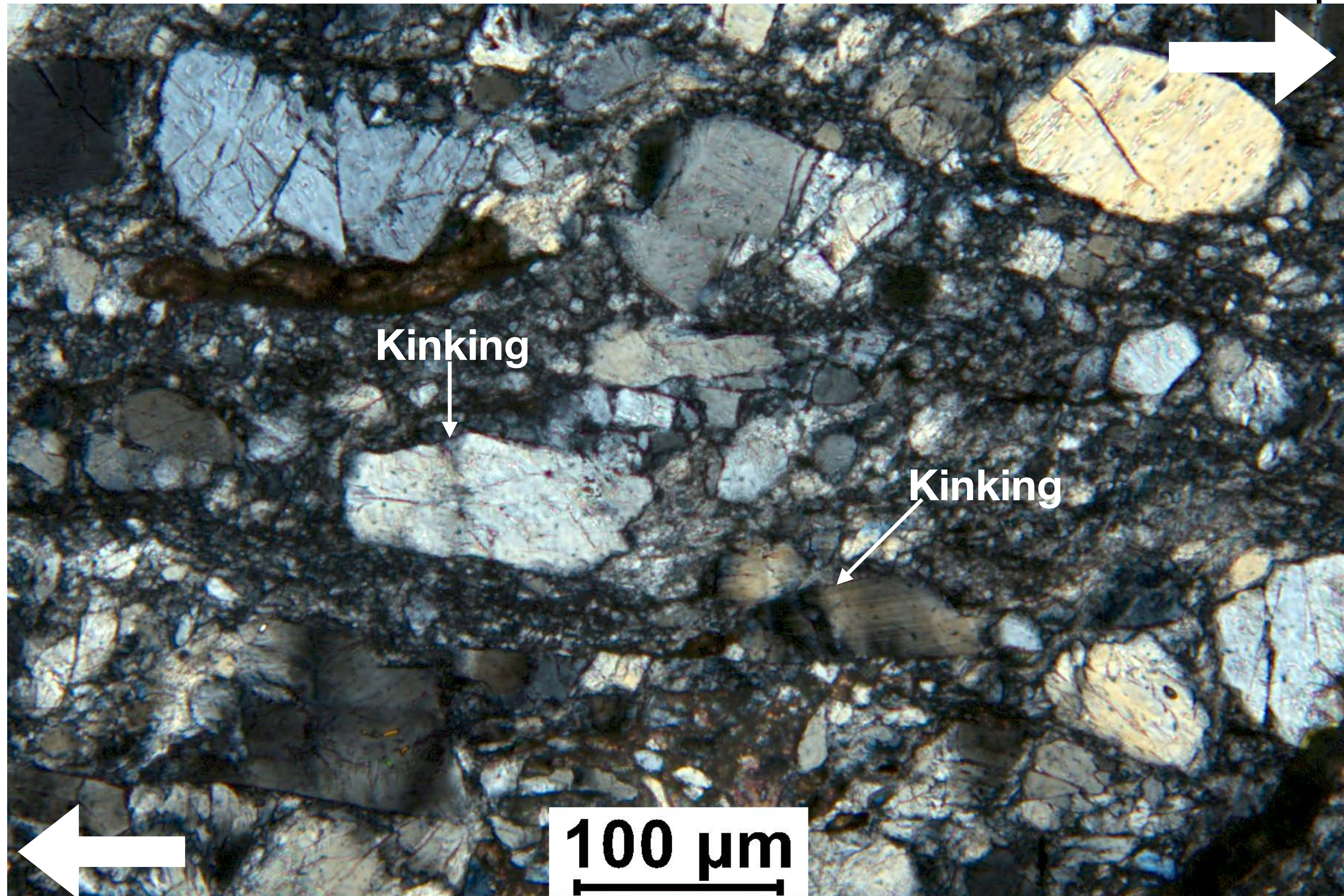
700°C|1.0 GPa| 3.6×10^{-6} shear strain rate|75-90 μm



Brittle-Ductile Deformation

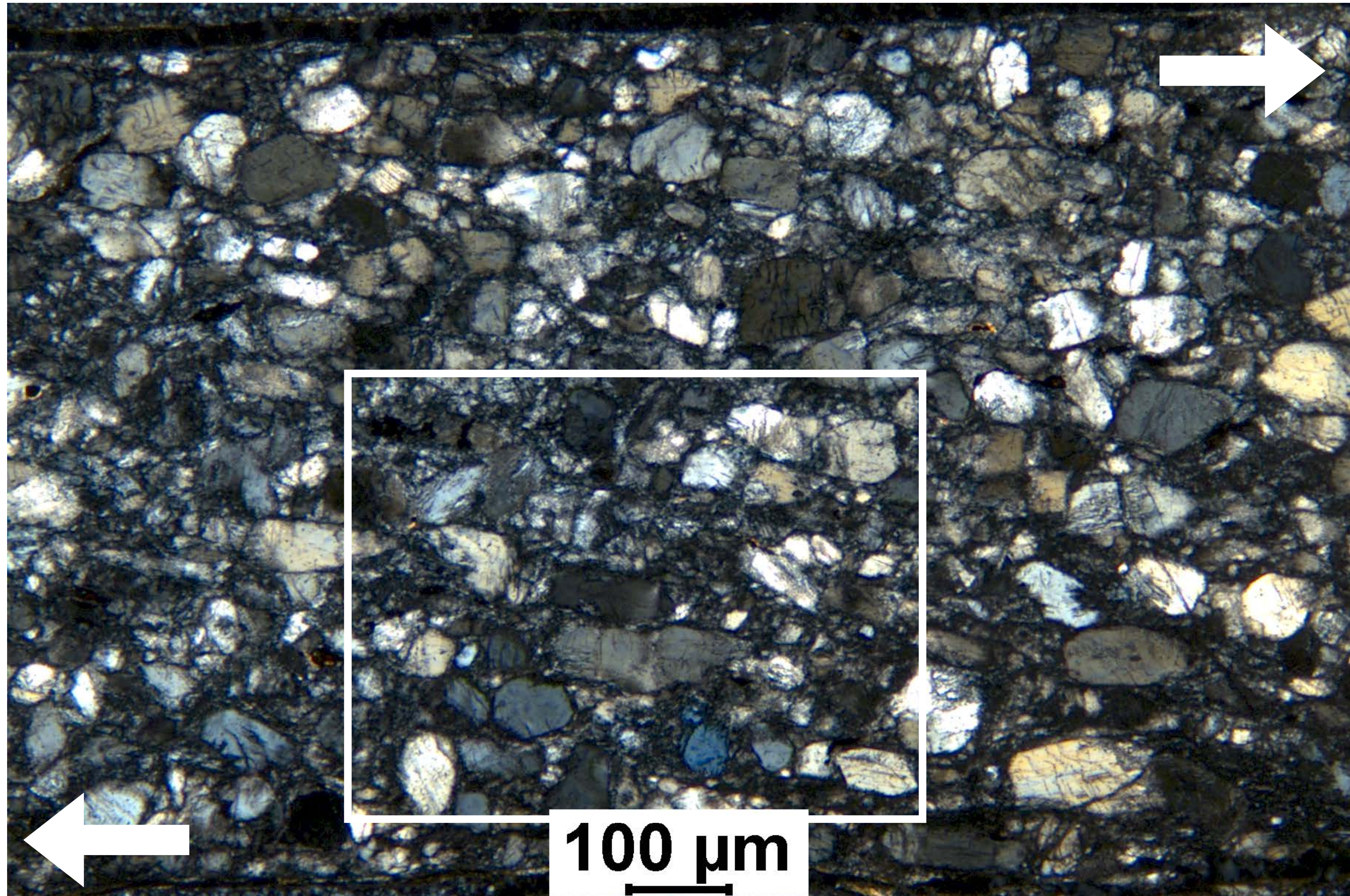
700°C|1.0 GPa|

3.6×10^{-6} shear strain rate|63-355 μm



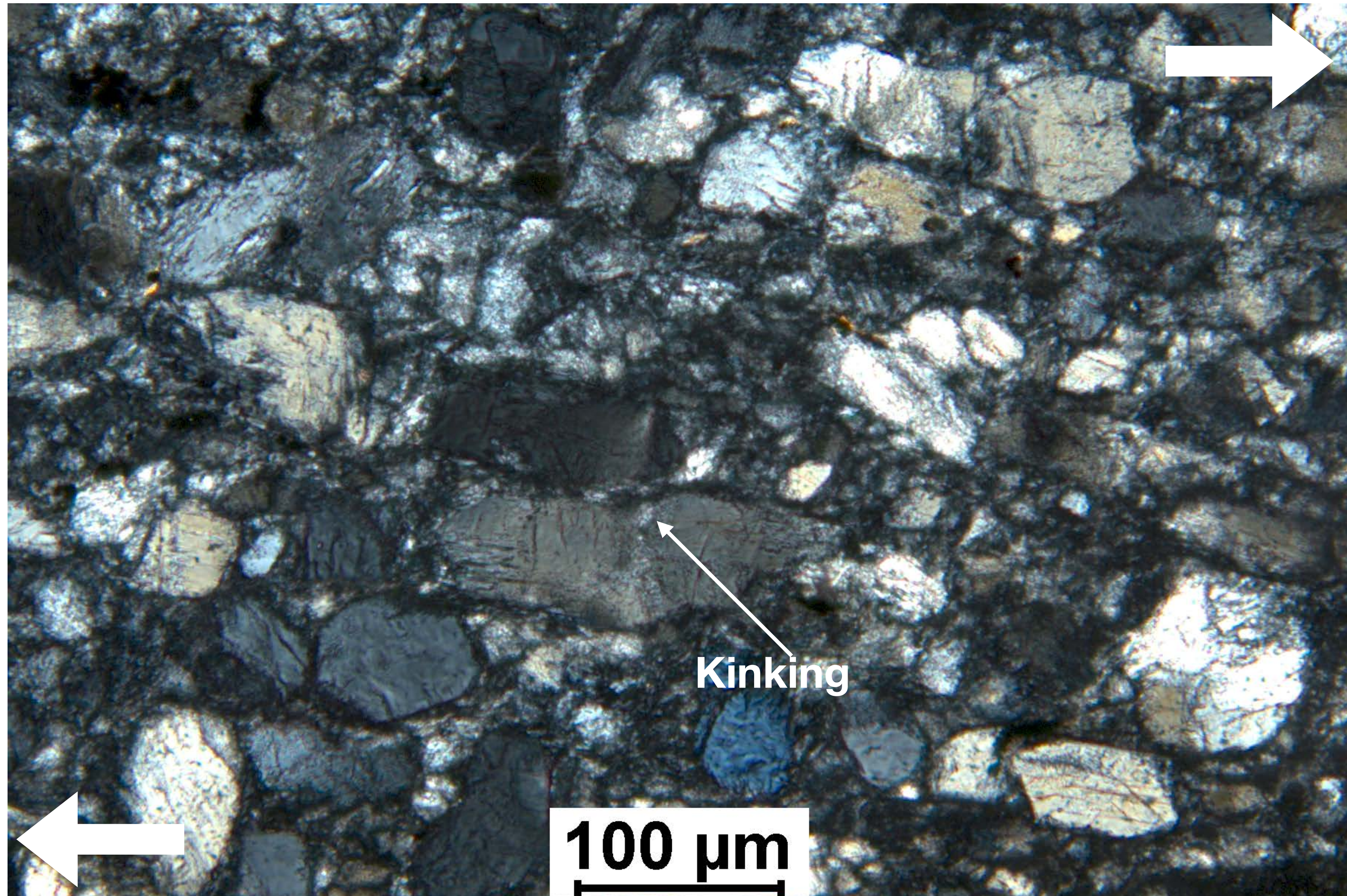
Brittle-Ductile Deformation

725°C|1.0 GPa|
3.6x10⁻⁶ shear strain rate|75-90 μm



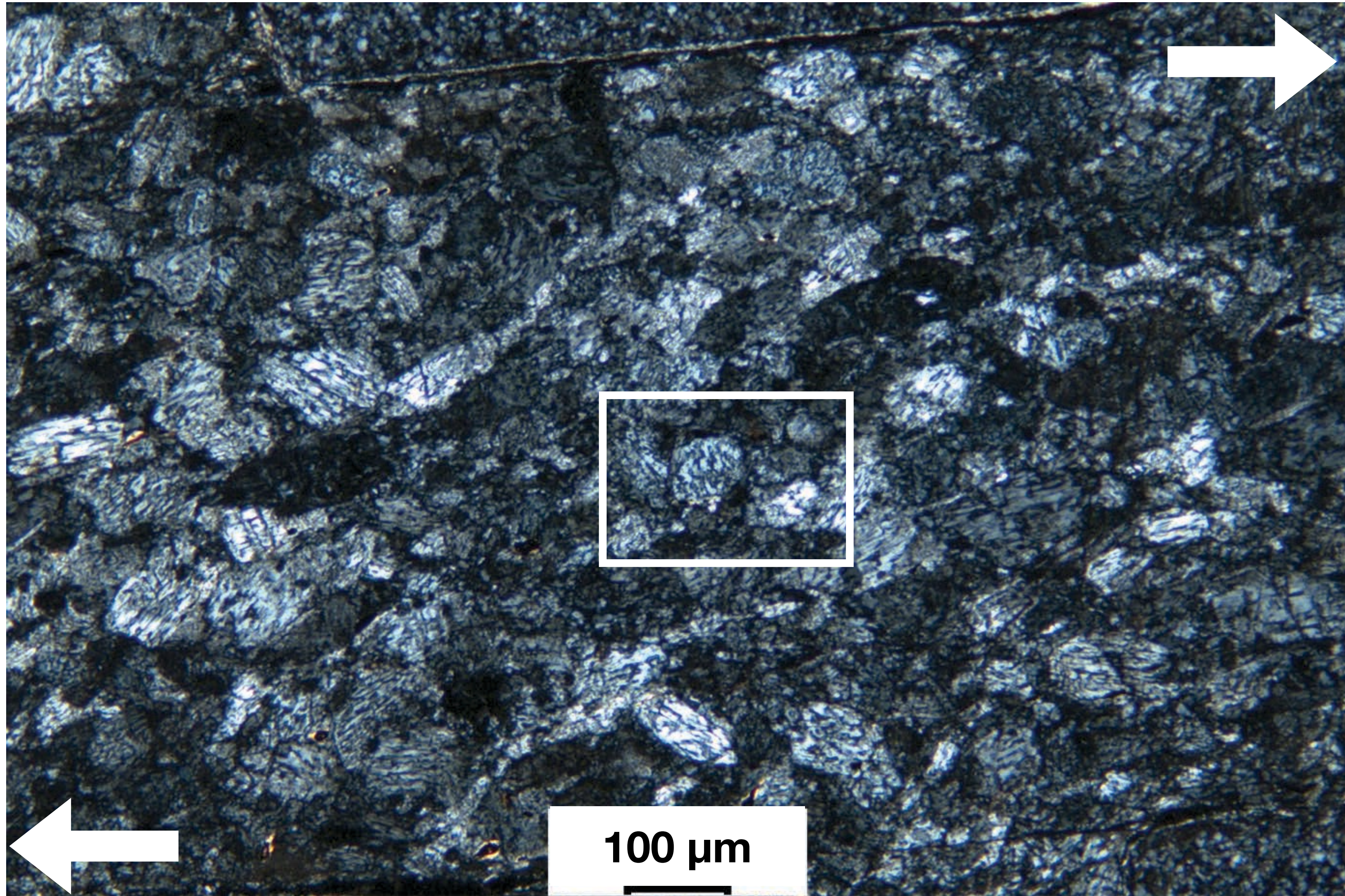
Brittle-Ductile Deformation

725°C|1.0 GPa|
3.6x10⁻⁶ shear strain rate|75-90 μm



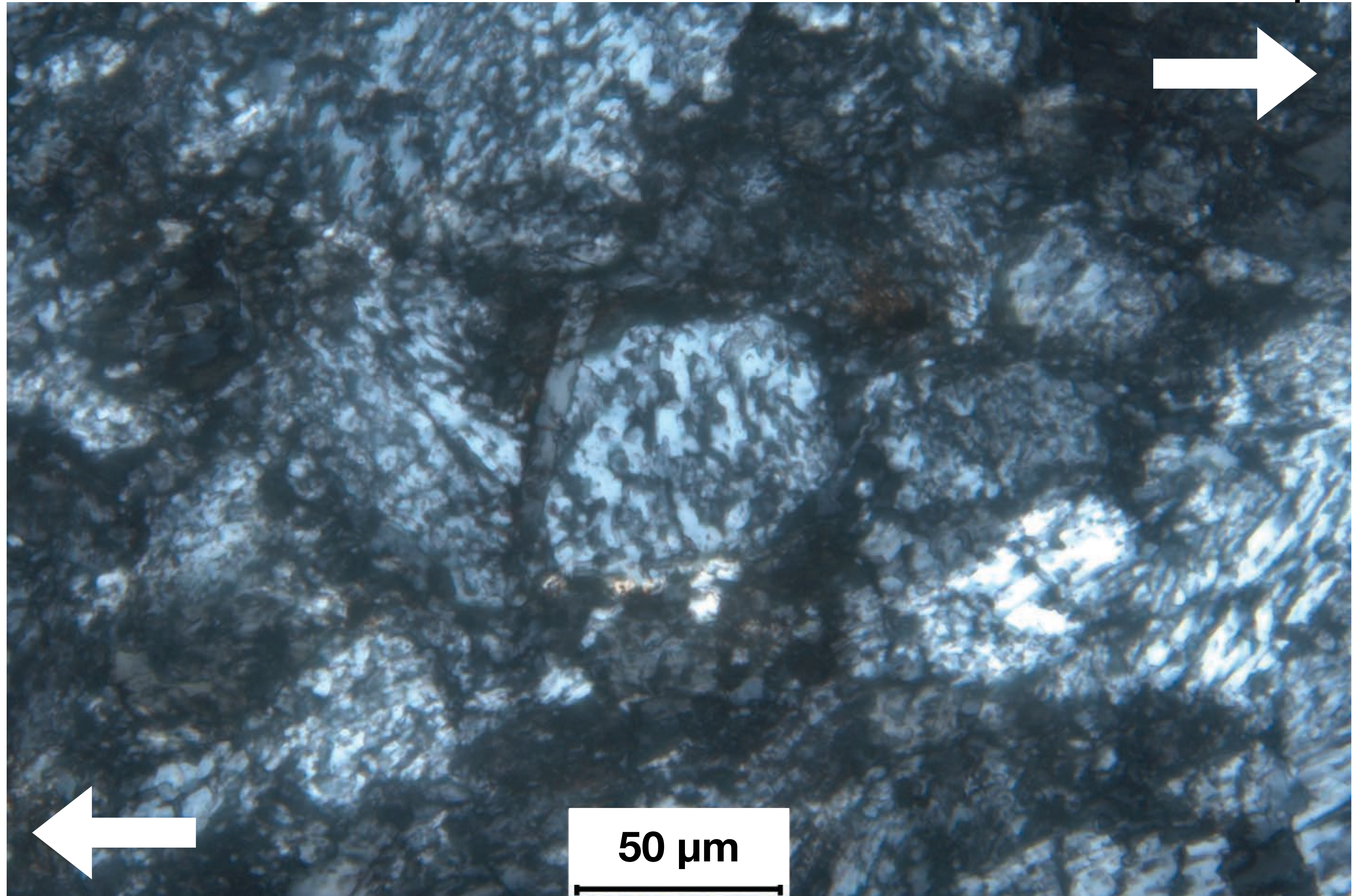
Exsolution

750°C|1.0 GPa|
3.6x10⁻⁶ shear strain rate|75-90 μm

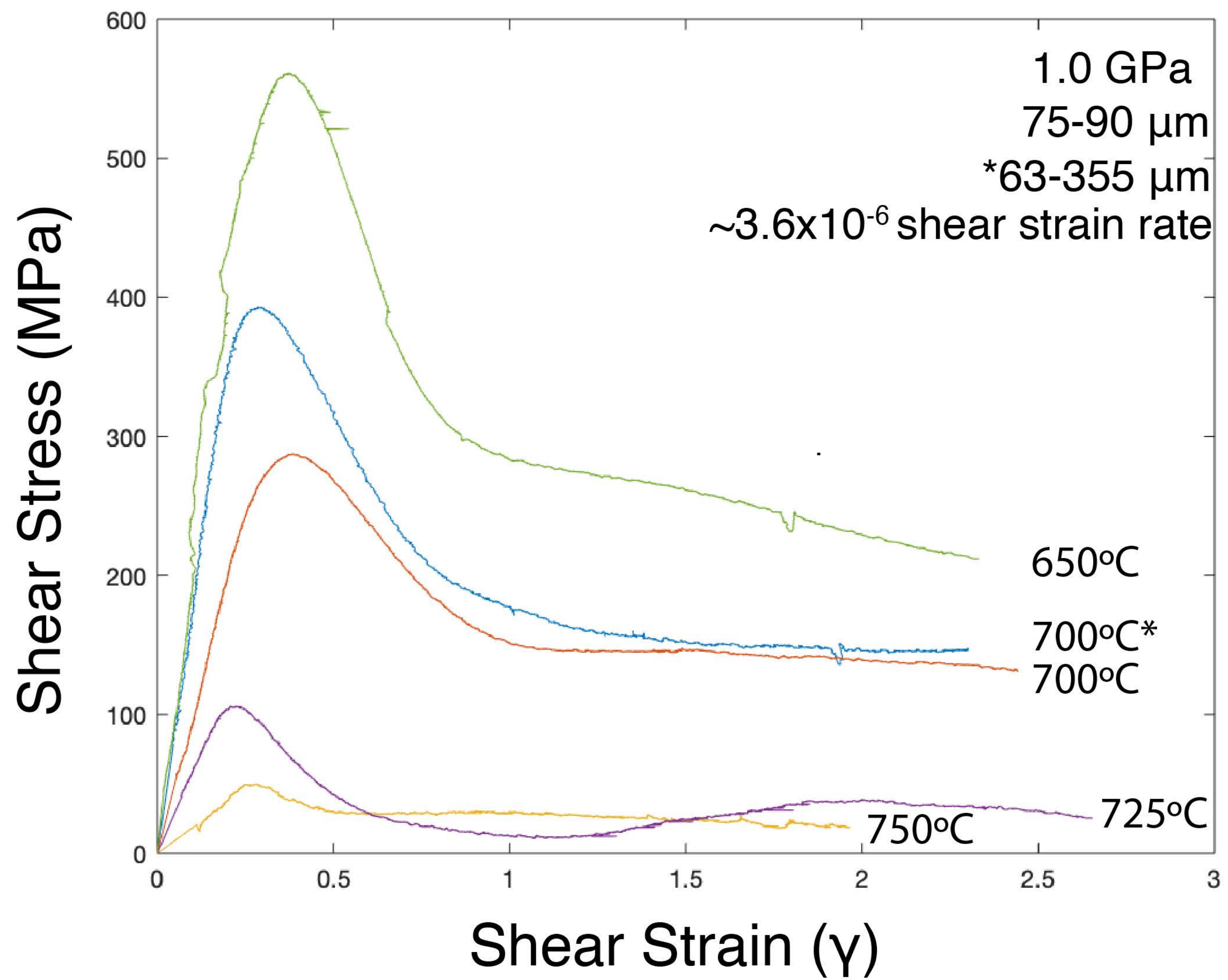


Exsolution

750°C|1.0 GPa|
3.6x10⁻⁶ shear strain rate|75-90 μm



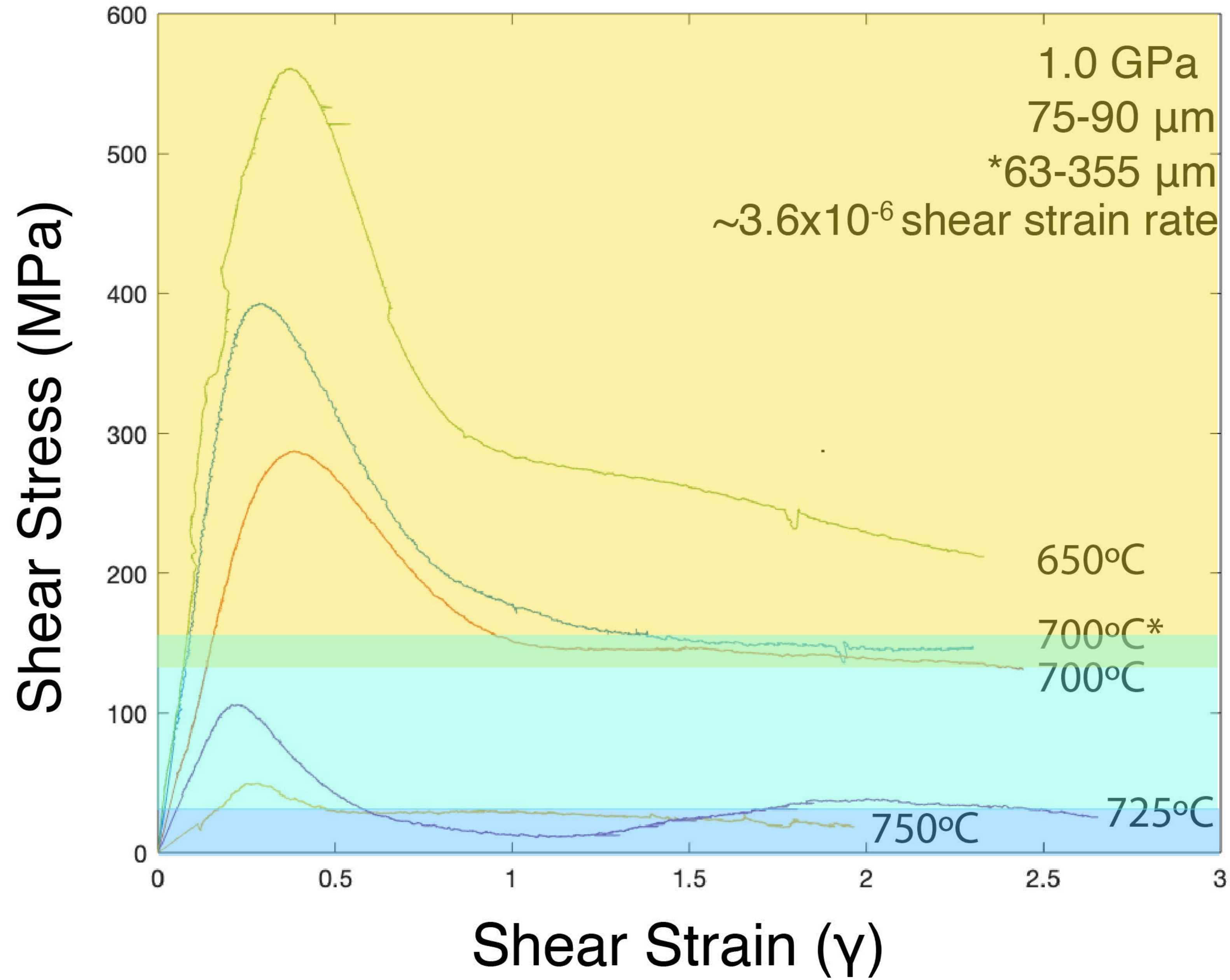
Mechanical Data



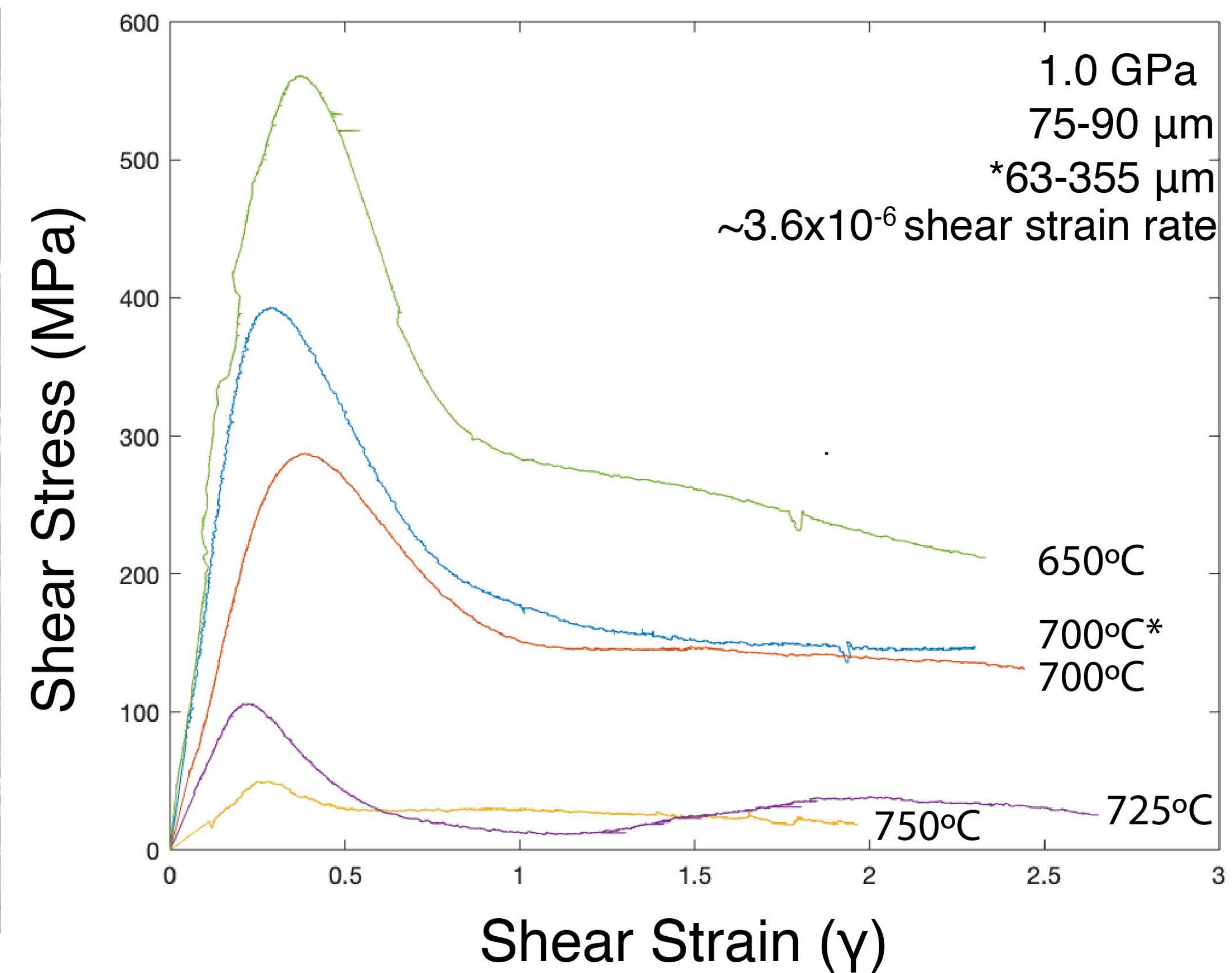
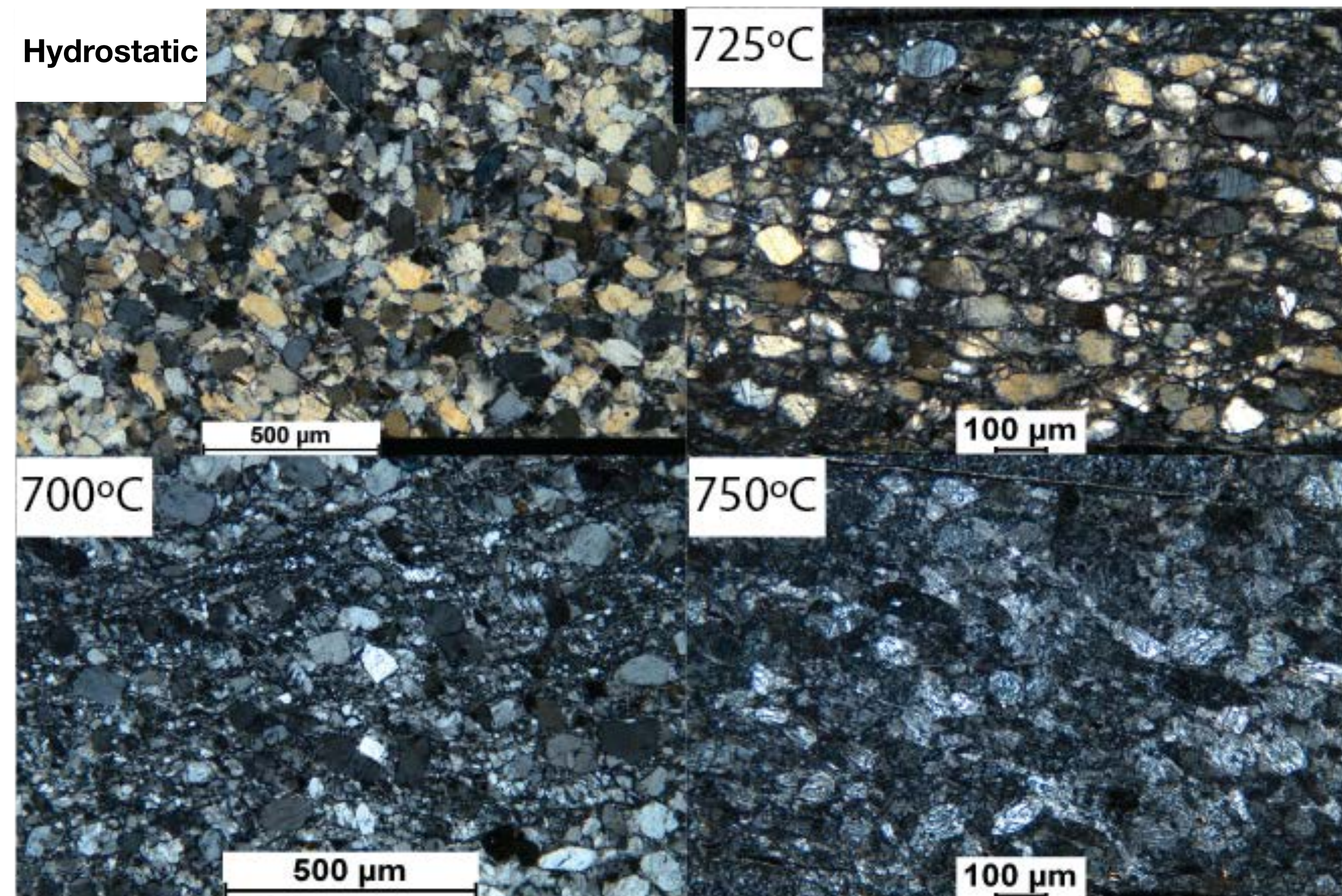
Mechanical Data

Brittle

Brittle-Ductile
Exsolution



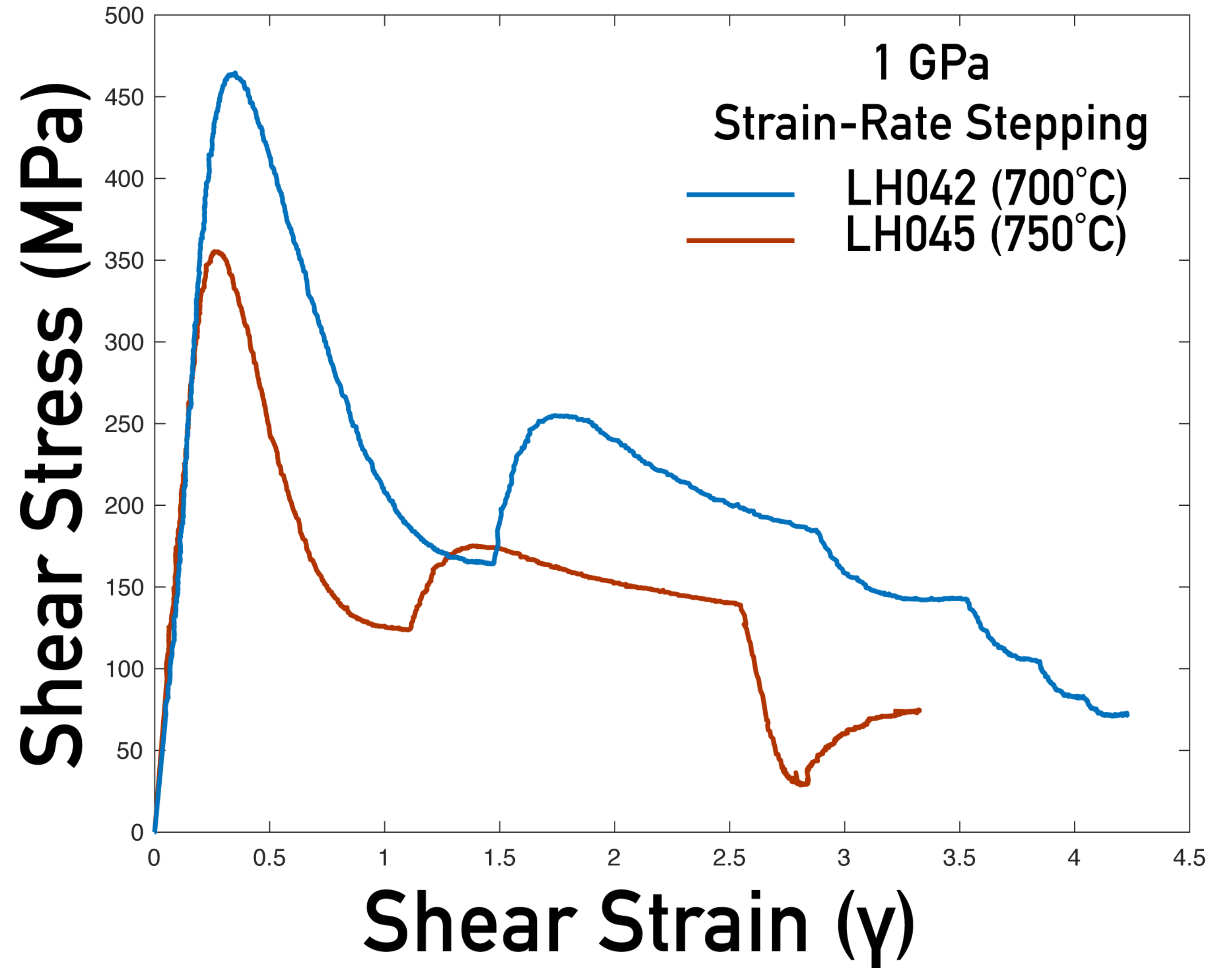
Main Points



Future Work

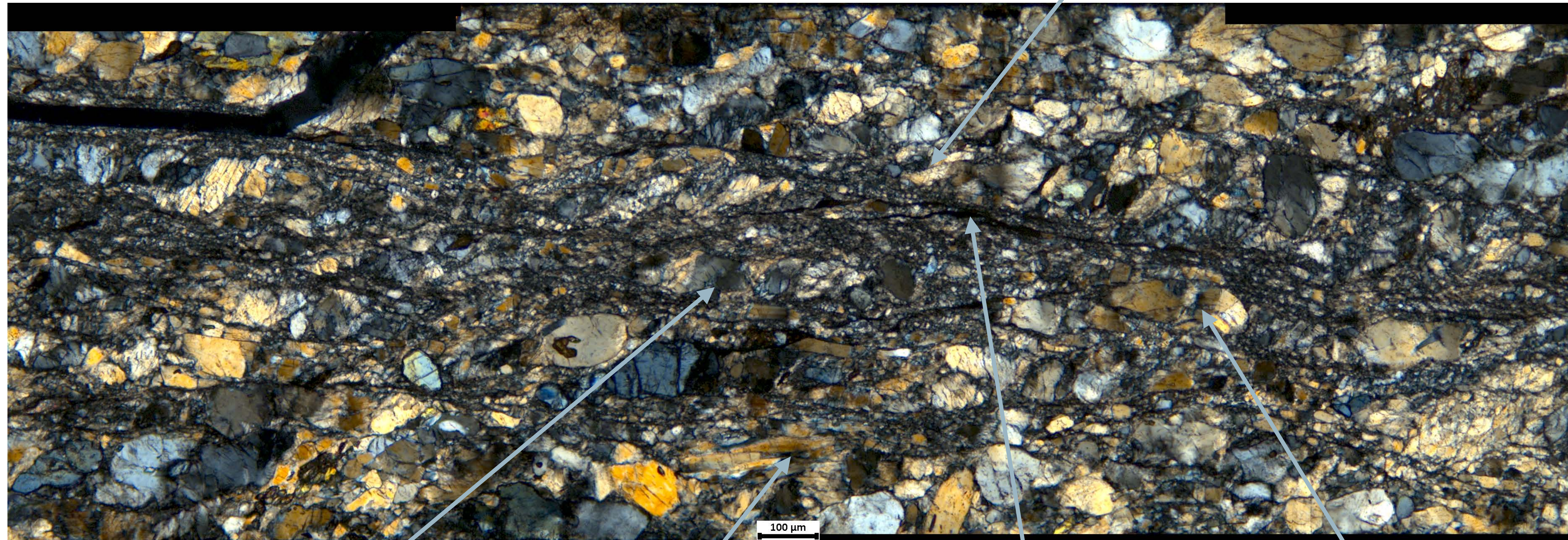
Strain Rate Stepping:

- *Brittle-Ductile*
- *Stress exponents of:*
 - *700C: ~3.3*
 - *750C: ~1.5*



Future Work

700°C|1.0 GPa|strain rate stepping|63-355 μm



brittle offset

recrystallisation

kinks

localised
shear bands

kink boundaries

Thanks!

