

# Fluid inclusions as micro-chemical systems: evidence and modelling of fluid-host interactions in plagioclase

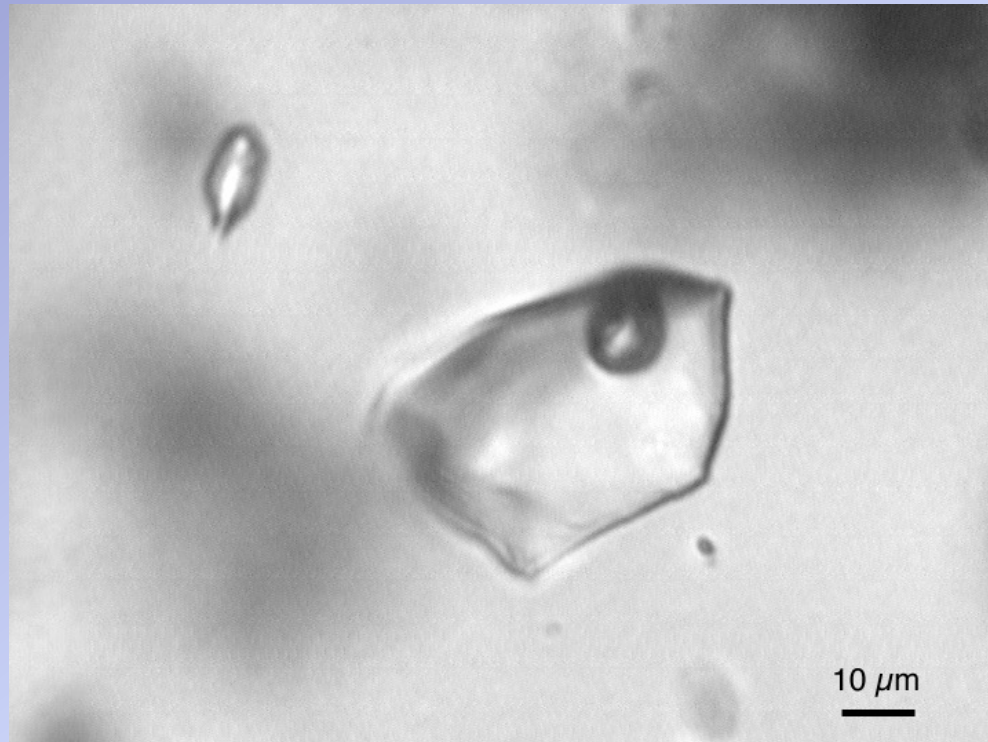
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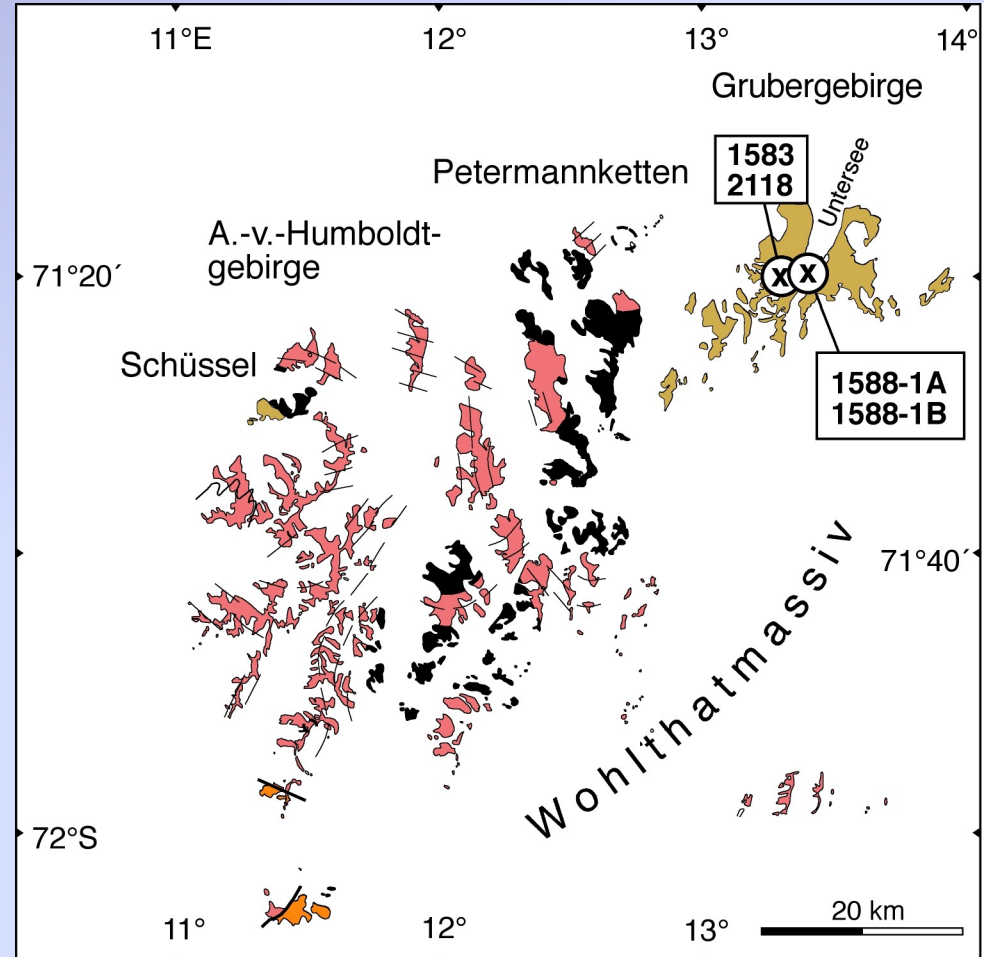
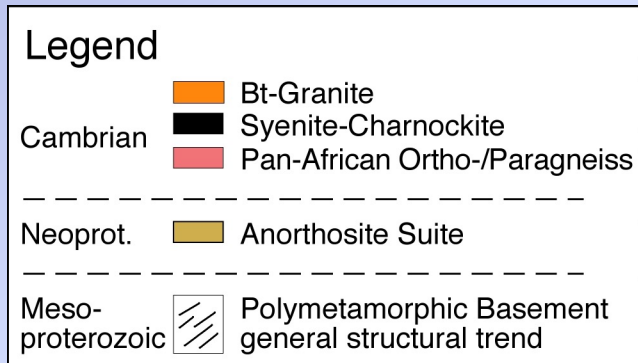
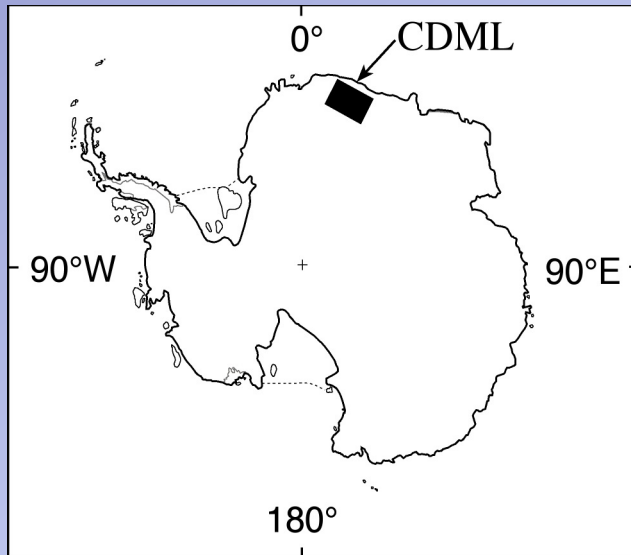
# Alteration of Fluid Inclusions ?



1. Stress / Strain
2. Diffusion
3. Reaction

# Case Study\*

## Otto von Gruber Anorthosite central Dronning Maud Land (East Antarctica)



\* PhD B. Kleinfeld

Plagioclase:

$An_{45} - An_{54}$

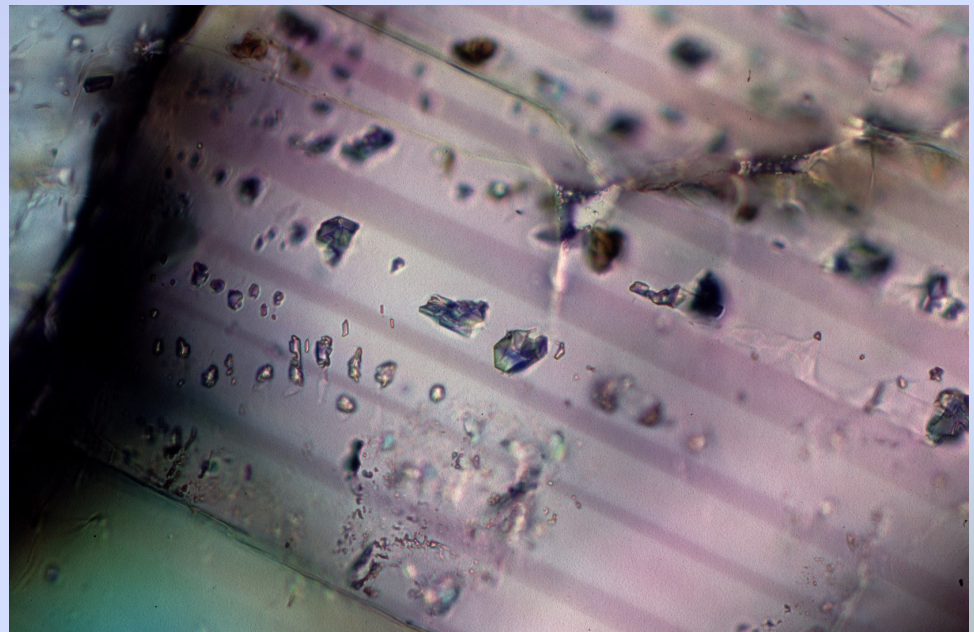
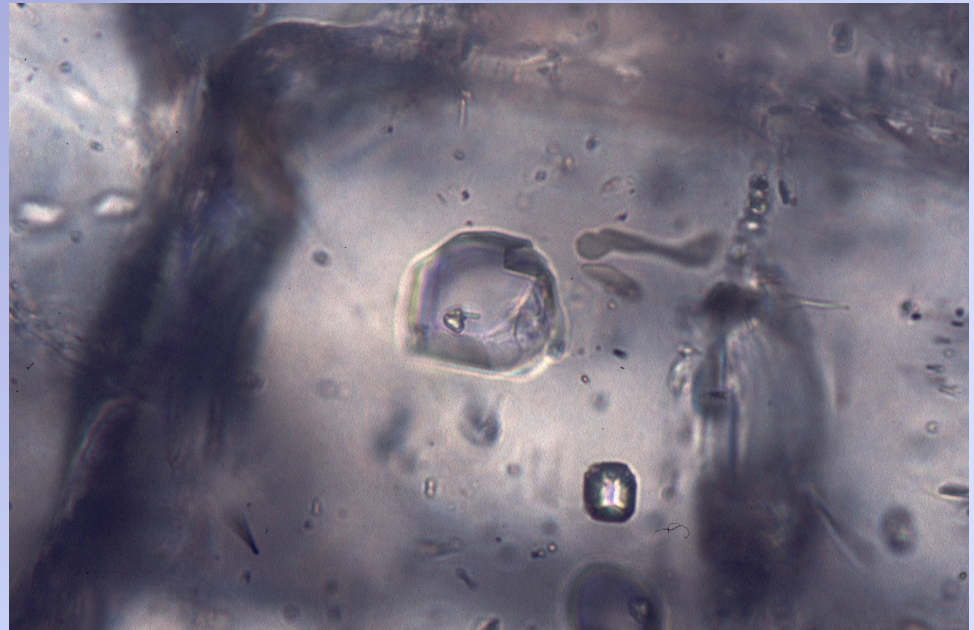
Fluid Inclusions:

roundisch, oval to  
negative-crystal shapes

7 to 15  $\mu m$

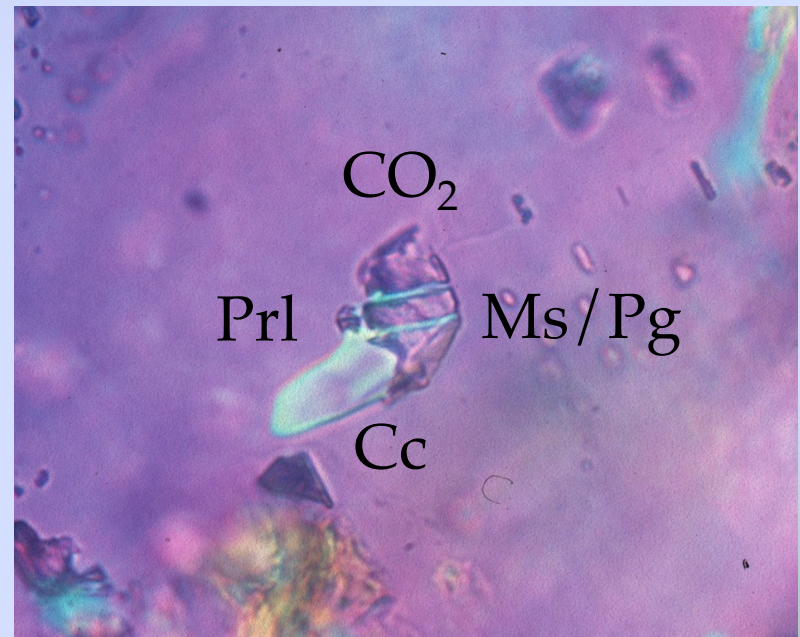
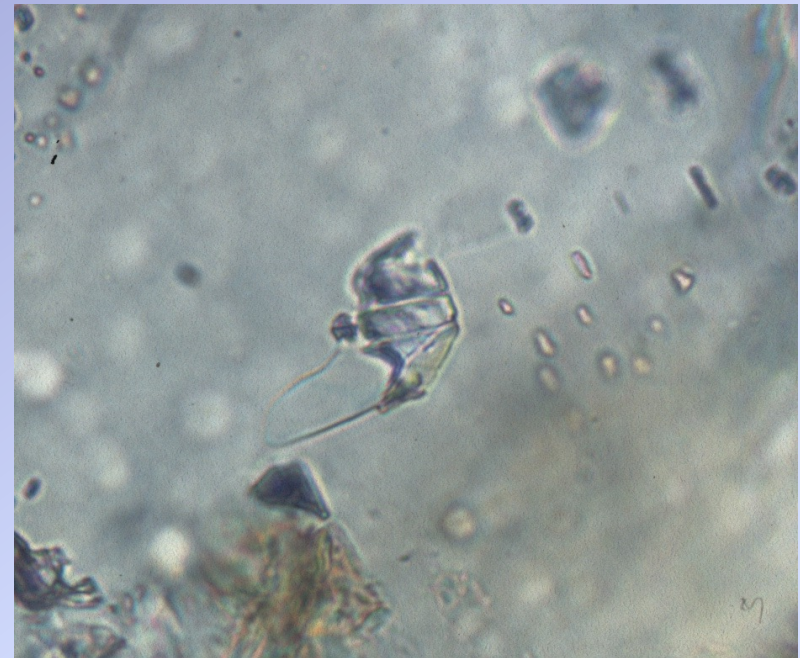
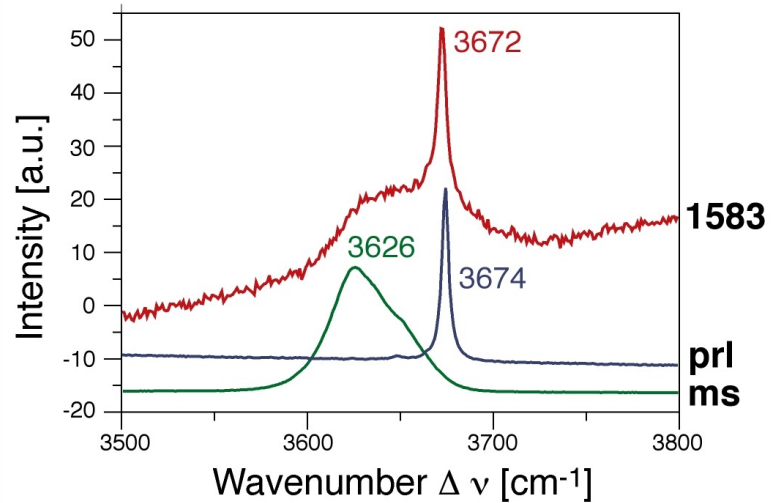
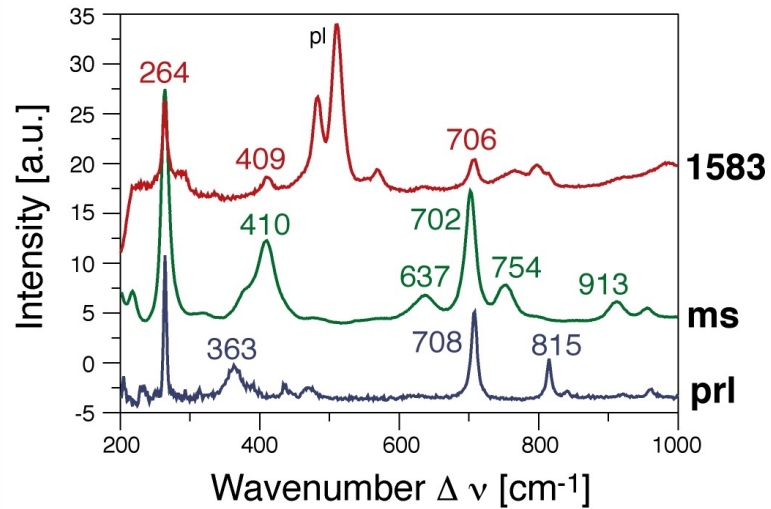
$CO_2$

$\pm$  solids





# Raman spectroscopy



Where do these enclosed solids come from?

1. accidentally trapped

2. daughter crystals

3. reaction products

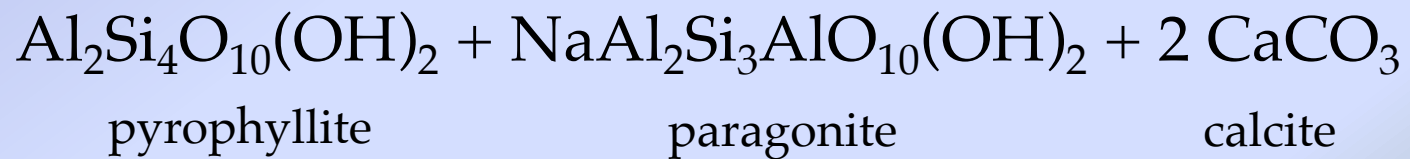
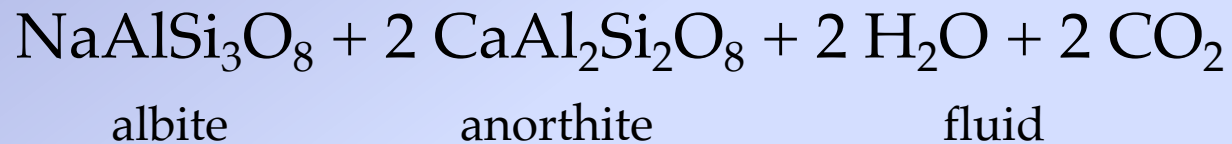
# Reaction

plagioclase + fluid = ?



# Reaction

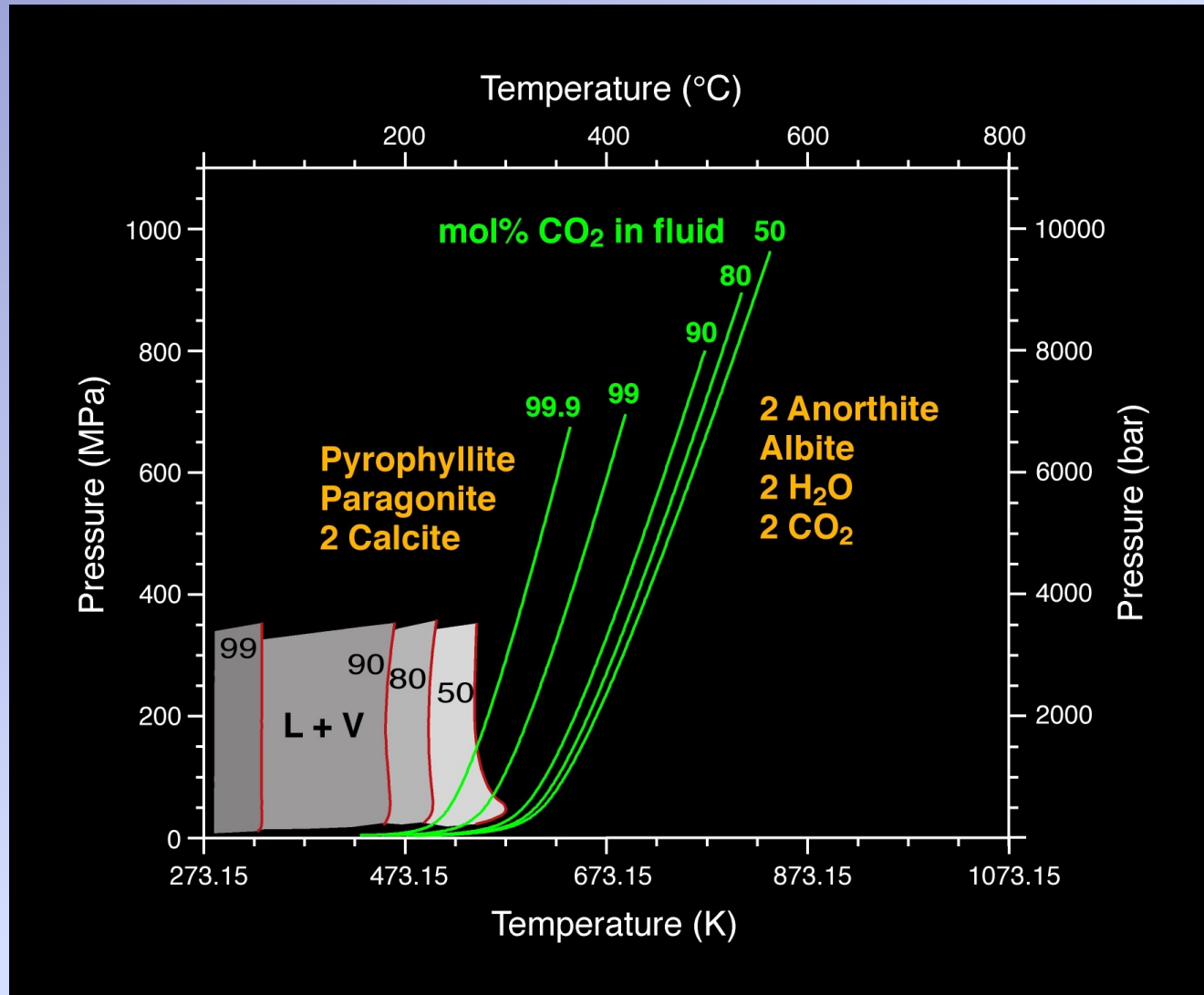
plagioclase + fluid = ?

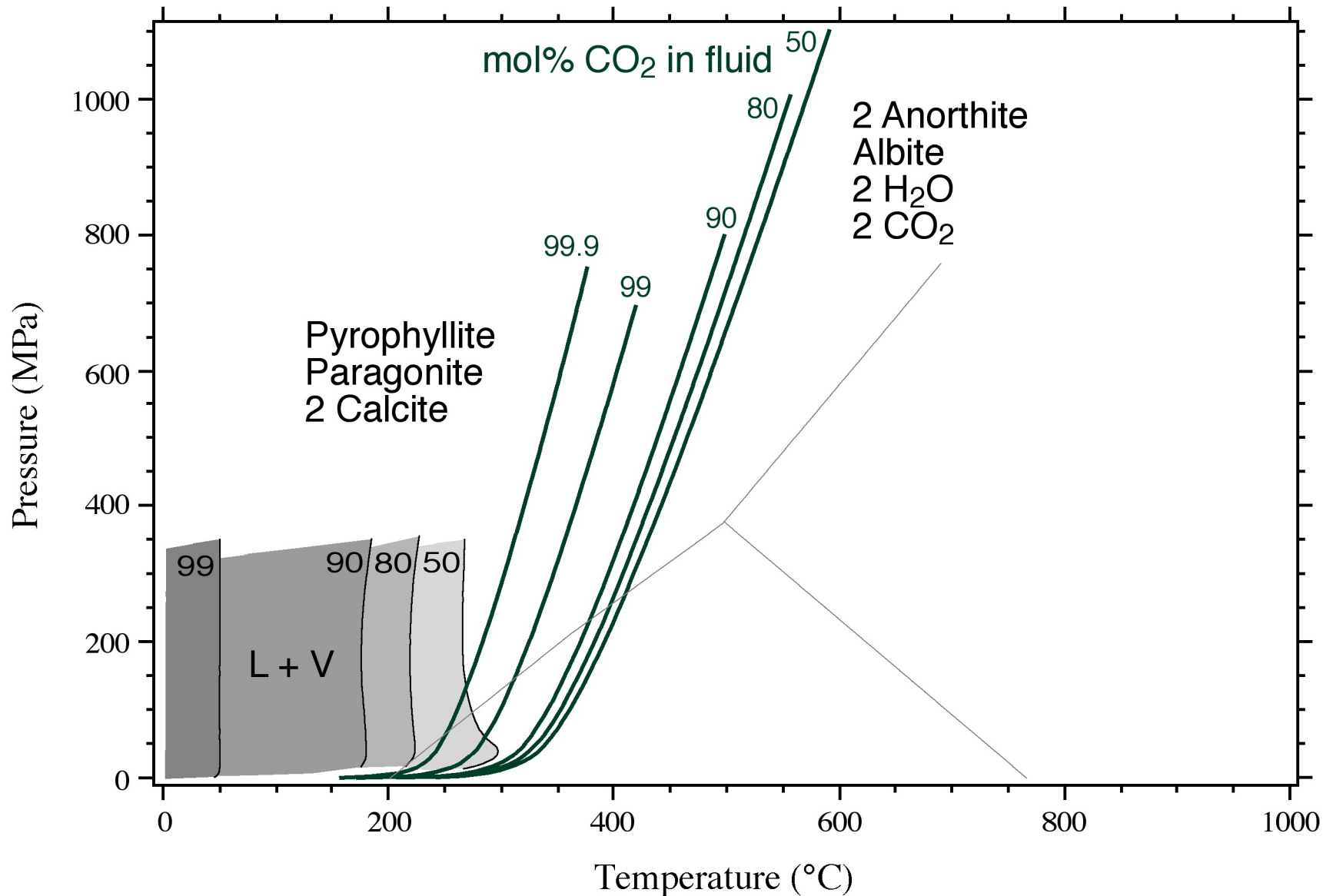


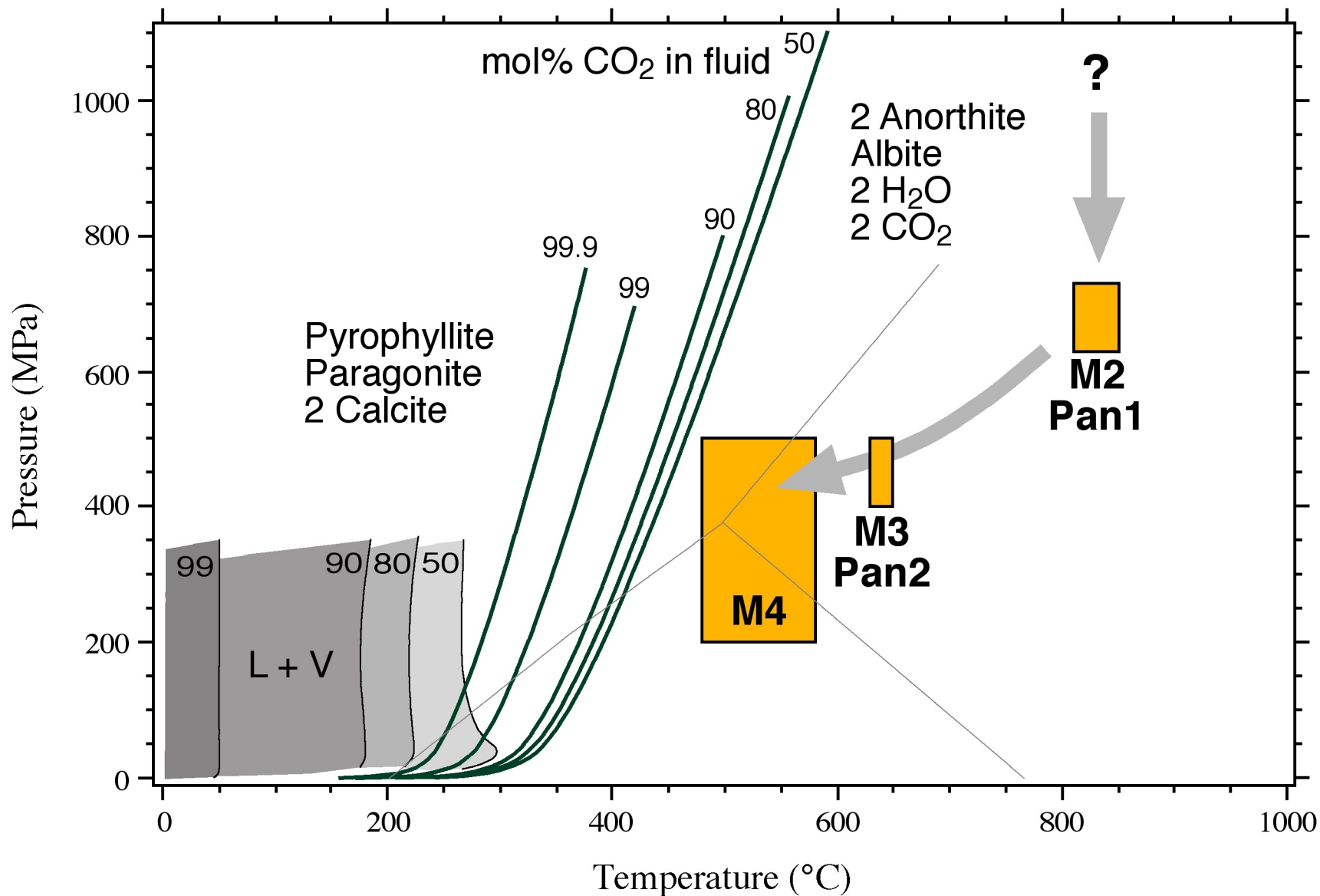


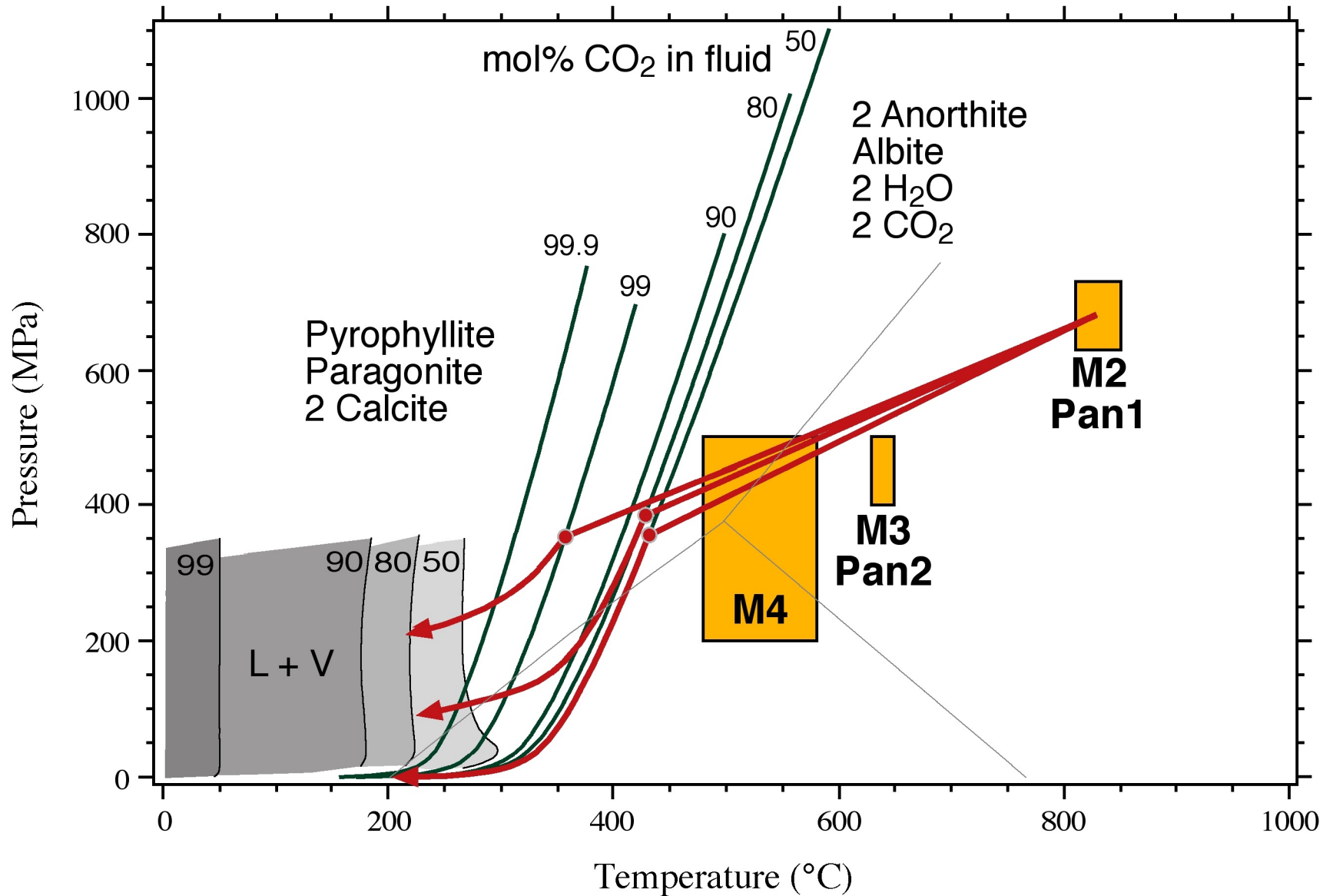
# Does the reaction take place?

$$\Delta_R G = \sum v_i G_i = 0$$

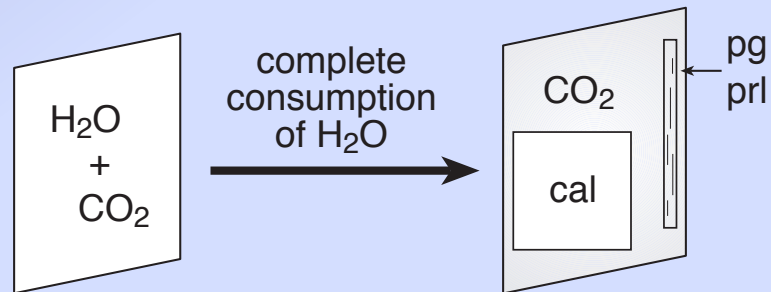
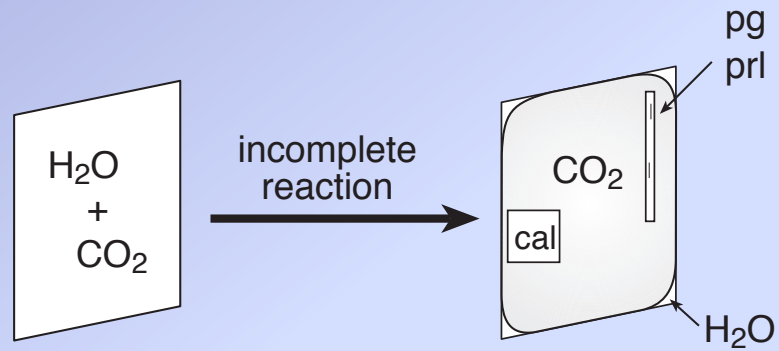
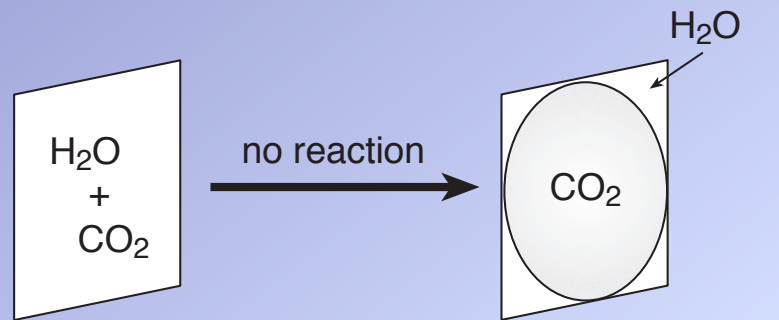


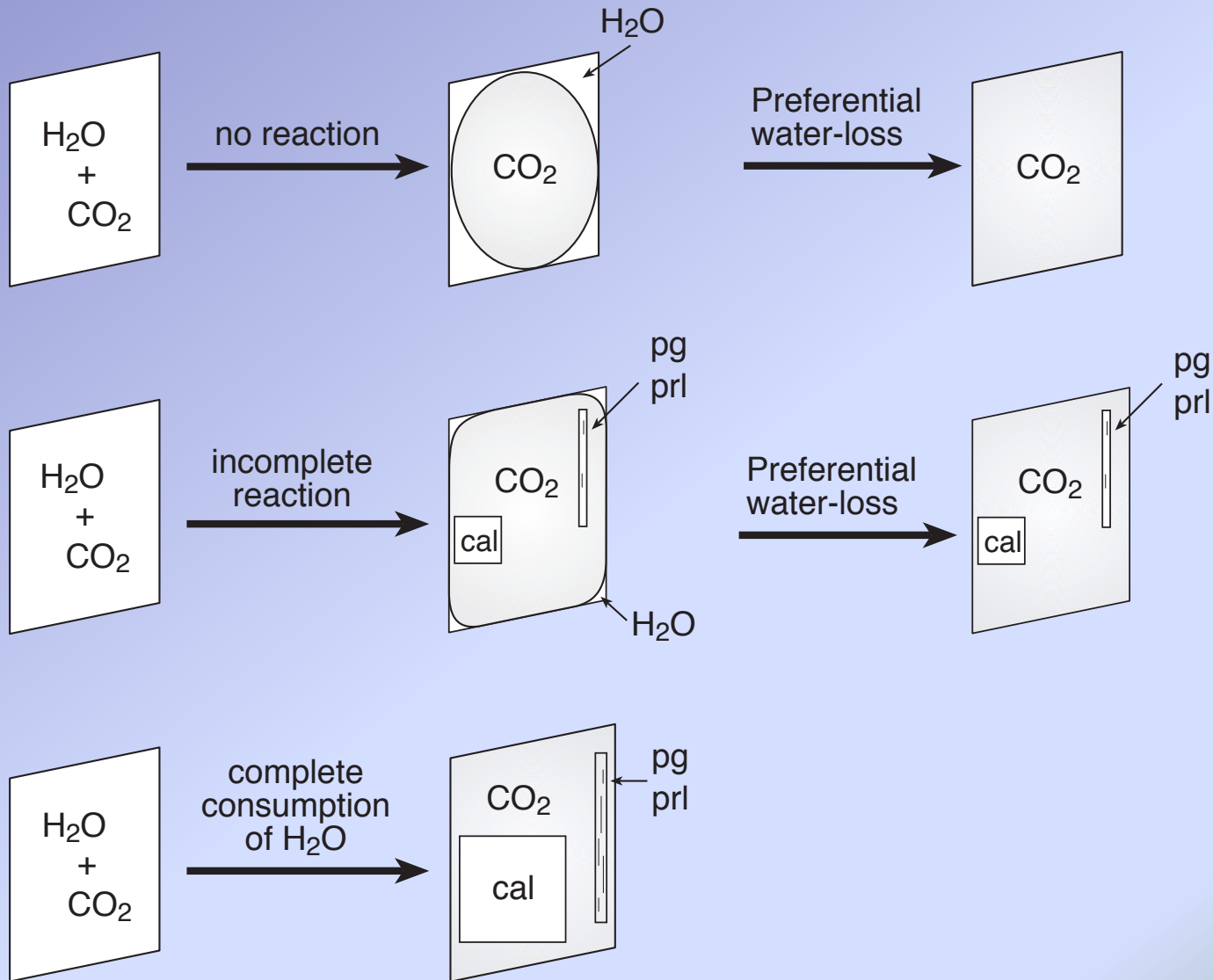












# Conclusions

- OH-bearing sheet-silicates

aqueous component within original entrapped fluid

- Amount of  $\text{H}_2\text{O}$  initially trapped controls extent of reaction

- Reconstruction possibilities

- Uncertainties

absence of free  $\text{H}_2\text{O}$   
volume fractions