ESRF	**Experiment title:** **P-V equation of state and amorphiza of biotite and phlogopite**	**Experiment number:** **CH-1018**
Beamline: ID09	**Date of experiment:** from: 28/04 to: 02/05/01	**Date of report:** 18/02/02
Shifts: 12	**Local contact(s):** Sani Alessandra	*Received at ESRF:*

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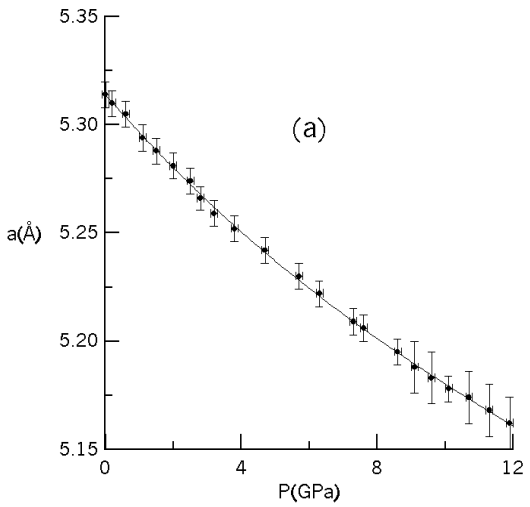
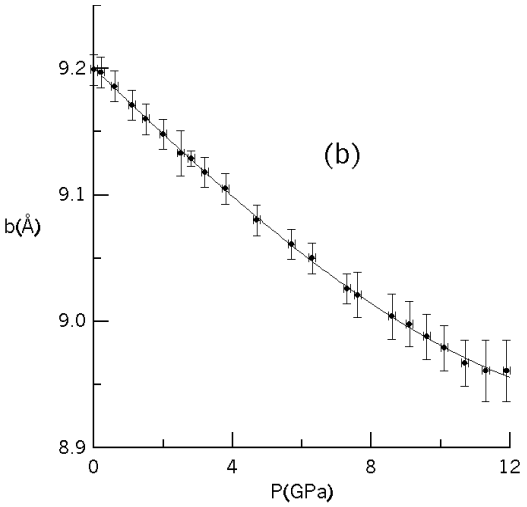
Report:

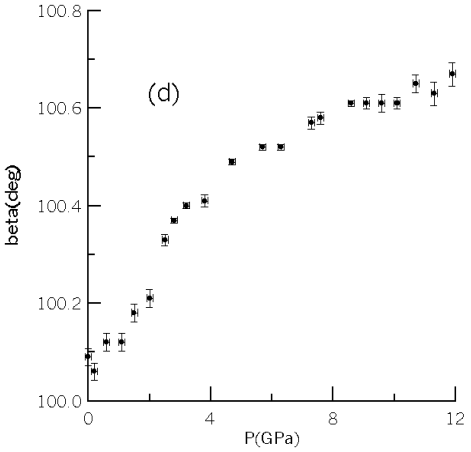
Micas play an important role in the metamorphic environment as geothermometers and geobarometers (Guidotti, 1982; Sassi *et al*., 1994), and the knowledge of their thermoelastic properties is important to fully understand the behaviour at non-ambient conditions of these minerals in petrogenetic processes. We have undertaken an investigation devoted to determine the axial compressibilities and the equation of state (EoS) of natural phlogopite exploring a significantly larger baric interval (up to 12 Gpa). The sample was a natural phlogopite (1M-polytipe, SG *C2/m*) with an average composition of $(K_{0.99}Na_{0.02})(Mg_{2.73}Fe_{0.15}Al_{0.06}Ti_{0.02})(Al_{1.07}Si_{2.93})O_{10}(OH)_2$.

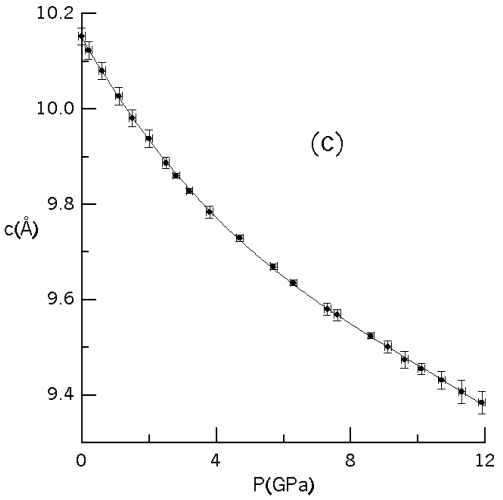
The high-pressure experiment was carried out at the ID9 beam-line, using an angle disperse set-up from room conditions to 12 GPa by means of a Diamond Anvil Cell. Nitrogen has been used as pressure medium. The diffraction pictures have been collected on an Imaging Plate and the 2? -intensity patterns has been obtained by a radial integration (FIT2D software). In full, we base the present analysis on 22 pressure points.

The cell edge parameters have been extracted by using a full profile fitting (GSAS software); the plot of cell edges and angle vs. pressure is show in the pictures above. The compressibility coefficients at room conditions calculated by fitting the third order Birch-Murnaghan EoS are K_0= 49.7(? 0.5) GPa, K'_0=8.59(? 0.19), this result is in good agreement with the EoS's of similar micas.


(a)
a(Å)
5.35
5.30
5.25
5.20
5.15
0
4
8
12
P(GPa)


(b)
b(Å)
9.2
9.1
9.0
8.9
0
4
8
12
P(GPa)


(d)
beta(deg)
100.8
100.6
100.4
100.2
100.0
0
4
8
12
P(GPa)


(c)
c(Å)
10.2
10.0
9.8
9.6
9.4
0
4
8
12
P(GPa)