



## Experimental petrology: a new insight into deep Earth composition

Jakub CIAŻELA

*Institute of Geology, Adam Mickiewicz University, ul. Maków Polnych 16; 61-606 Poznań, Poland;  
e-mail: jakub.ciazela@gmail.com*

Meteorites remain the main data source for inferring deep Earth composition (McDonough 2003; Palme, O'Neill 2003) whereas seismic waves give fundamental information on the structure of our planet (Bina 2003; McDonough 2003). However, the constant development of high pressure methods in recent decades has allowed us to simulate core and mantle conditions on the surface of the Earth. As a consequence, we can examine the mineralogical composition, crystal structure and physical structure of experimental samples of a meteorite composition and compare these features to those which are expected from geophysical and computational data (Li, Fei 2003).

Two main approaches are used to reach high pressure conditions. One is maximizing the force and second is minimizing the area. The first approach is based on the multianvil press technology, and pressures up to 26 GPa can at present be achieved in a moment (Frost et al. 2004). The second approach is connected with the use of diamond anvil cells. It allows us to reach pressures greater than 365 GPa (Bassett 2009) which correspond to the pressure in the centre of the Earth. In the presented poster, an explanation of the two methods mentioned above will be followed by a review of experimental results obtained through application of these techniques in the last decade.

### References:

- Bassett, W. A. (2009). Diamond anvil cell: 50<sup>th</sup> birthday. *High Pressure Research*, 29, 163-186.
- Bina, C. R. (2003). Seismological constraints upon mantle composition. In R. Carlson (Ed.) *The mantle and core*. In H. D. Holland & K. K. Turekian (Eds.) *Volume 2 Treatise on geochemistry* (pp. 39-60). Amsterdam: Elsevier.
- Frost, D. J., Poe, B. T., Tronnes, R. G., Liebske, C., Duba, A. & Rubie, D. C. (2004). A new large-volume multianvil system. *Physics of the Earth and Planetary Interiors*, 143-144, 507-514.
- Li, J. & Fei, Y. (2003). Experimental constraints on core composition. In R. Carlson (Ed.) *The mantle and core*. In H. D. Holland & K. K. Turekian (Eds.) *Volume 2 Treatise on geochemistry* (pp. 547-568). Amsterdam: Elsevier.
- McDonough, W. F. (2003). Compositional model for the Earth's core. In R. Carlson (Ed.) *The mantle and core*. In H. D. Holland, K. K. Turekian (Eds.) *Volume 2 Treatise on geochemistry* (pp. 547-568). Amsterdam: Elsevier.
- Palme, H. & O'Neill, St. C. H. (2003). Cosmochemical estimates of mantle composition. In R. Carlson (Ed.) *The mantle and core*. In H. D. Holland & K. K. Turekian (Eds.) *Volume 2 Treatise on geochemistry* (pp. 1-38). Amsterdam: Elsevier.