

MS17-P8 Garnet inclusions in diamond: The role of elastic propertiesLorenzo Scandolo¹, Sula Milani², Gabriele Zaffiro¹, Matteo Di Prima¹, Mattia L. Mazzucchelli¹, Matteo Alvaro¹, Chiara M. Domeneghetti¹, Fabrizio Nestola²

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Although inclusion-bearing diamonds are so rare (about 1% of the diamond retrieved), they are geologically relevant because they are the only direct and unaltered samples that we have from the Earth's mantle. Investigation of mineral inclusions still trapped in diamond allows retrieving several pieces of information about the Earth's interior and its active geodynamics (e.g. providing the definition of the initiation of subduction processes, capturing the redox state of the mantle etc... [1]). Therefore it is clear that the determination of the entrapment pressure (i.e. depth of formation) of these mineral inclusions is a fundamental tile for the understanding of the Earth's mantle dynamic as it allows constraining the chemico-physical environment in which diamond and their inclusions formed. The recently developed 'elastic geobarometer' method [2] allows retrieving the entrapment pressure for a diamond-inclusion pair provided the knowledge of the thermoelastic parameters for both diamond and inclusion. Since mineral inclusions in diamonds from the subcratonic lithospheric mantle are mostly represented by garnet (38%) together with olivine (18%), clinopyroxene (16%), orthopyroxene (8%), Mg-chromite (18%) and sulphides (2%) our study has been focused on the determination of reliable elastic properties for endmember garnets (e.g. pyrope, almandine, grossular and uvarovite). Knowledge of the thermoelastic properties for endmember garnets should in principle allow calculating thermoelastic parameters for potentially any garnet composition commonly found in diamond. In particular, here we present the investigation of endmember garnets thermal expansion by in situ single crystal X-ray diffraction at high-temperature conditions. The measurements have been performed on the same crystals used by [3] for their high-P investigation adopting the same methods for the unit-cell parameters determination (e.g. 8-position centring using SINGLE software, [e.g. 4, 5]). Further details on the high temperature apparatus and measurements method here adopted are reported in [6]. The thermal expansion so calculated allowed retrieving the entrapment pressure 5.67 GPa at 1500K for an eclogitic garnet with composition Py51Al22Gr27.

References [1] Shirey et al. (2013) *RiMG*, 75, 355. [2] Angel et al. (2014) *Am Mineral*, 99, 2146. [3] Milani et al. (2015) *Lithos*, in press [4] King and Finger (1979) *JAC*, 12, 374. [5] Angel and Finger (2011) *JAC*, 44, 247. [6] Alvaro et al (2015) *JAC*, submit.

Keywords: Diamond, Inclusion, Diffraction, Mantle, Garnet**MS17-P9** Quantitative in situ study of salbutamol crystallization as a function of relative humidity and temperatureOlga Narygina¹, Sarah Zellnitz², Christian Resch³, Hartmuth Schroettner⁴, Nora Anne Urbanetz²

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Salbutamol, a β_2 -adrenoreceptor agonist, is a common drug used for the treatment of bronchial asthma via inhalation. Spray dried salbutamol sulphate and salbutamol base particles intended for the use as active pharmaceutical ingredient in dry powder inhalers are amorphous as a result of spray drying (Littringer et al., 2013). However, the crystallization of the amorphous salbutamol particles may be triggered by exposure to humid air or by heating of the sample (Columbano et al., 2002). Knowing the critical conditions of salbutamol crystallization is essential for the correct handling and storage of the drug. In order to quantitatively characterize the process of salbutamol crystallization we performed a series of time-resolved powder X-ray diffraction experiments at variable temperature (25 and 35 °C) and relative humidity (60 %, 70 %, 80 %, 90 %). Quantification of amorphous-to-crystalline ratio as a function of time at variable temperature and relative humidity was performed using the Partial Least Squares Regression, PLSR (Degen et al., 2014; Zellnitz et al., submitted). We show that the crystallization speed of salbutamol sulphate and salbutamol base is a non-linear function of both temperature and relative humidity (Figure 1).

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