

## Trace element behaviour during magma mingling: the case study of the gabbro-granite association of Ota (western Corsica)

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The gabbro-granite association of Ota developed during the post-collisional phase of the Variscan orogeny, at about 280 Ma [3]. Gabbros and granites display mingling relations indicating their coeval crystallization [1]. The gabbros are characterized by ophitic clinopyroxene with coronas of titanian pargasite. The granites are subsolvus and characterized by biotite as the only mafic phase. On the basis of Nd-Sr-O isotope compositions, the granites were related to partial melting of lower-crustal reservoirs (Poitrasson et al., 1995). Hybrid rocks develop along the contacts between gabbros and granites, and are mostly represented by clinopyroxene-free, hornblende-rich quartz-diorites to quartz-monzodiorites. Minor hornblende-bearing granodiorites to monzogranites are also locally present. The hybridization is shown by field relations, complex chemical zonings of plagioclase and hornblende, and by the common occurrence of acicular apatite, skeletal opaque phases and quartz ocelli rimmed by hornblende coronas. To decipher the chemical effects of the mingling between basic and acid magmas, trace element mineral analyses have been carried out by LA-ICP-MS. Clinopyroxene compositions indicate that the gabbros formed by fractional crystallization of tholeiitic melts, overall similar to transitional MORB. Plagioclase and amphibole exhibit a decrease of Ti, Zr, Hf, Eu, Sr and Ba from the gabbros to the hybrid rocks and to the biotite-bearing granites. Conversely, the abundances of Rb and Pb increase. These mineral variations parallel the whole-rock chemical compositions of gabbros and granites, which were interpreted to represent the original basic and acid melts, respectively [2]. The intermediate chemical feature of plagioclase and amphibole from the hybrid rocks thus indicates a process of chemical mixing between mantle and crustal liquids. The variations of LREE, U and Th abundances in plagioclase and amphibole do not display a simple correlation with whole-rock chemical variations, and are most likely controlled by the development of LREE-, U- and Th-rich accessory phases (i.e. allanite and zircon).

[1] Platevoet B. and Bonin B., (1991), In *Enclaves and Granite Petrology*, pp. 191-204.

[2] Poitrasson F., Duthou J.L. and Pin C., (1995), *J. Petrol.* **36**, 1251-1274.

[3] van Tellingen W., Verschure R. and Andriessen P., (1988), *Bull. Soc. géol. France* **6**, 973-977.

## Carbon isotopic composition of macrodiamonds from Yubileynaya pipe (Yakutia)

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Yubileynaya pipe is one of the largest diamond mine in Yakutia. The  $\delta^{13}\text{C}$  values of 12 diamonds about 2 mm in average size are reported. All crystals contain mineral inclusions of U-type mantle paragenesis (olivines, chromite and pyropes). 100Mg/(Mg+Fe) ratio in olivines vary from 92.0 to 93.3 % ( $\bar{x}=92.8$ ). NiO contents vary from 0.34 to 0.37 wt.%,  $\text{Cr}_2\text{O}_3$  - 0.03-0.08 wt.% and CaO - to 0.02 wt.%. The garnets are presented by high-Mg subcalcic pyropes with  $\text{Cr}_2\text{O}_3$  contents from 8.91 to 9.94 wt.%.

Obtained  $\delta^{13}\text{C}$  values vary from -2.9 to -5.9 ‰ ( $\delta^{13}\text{C}_{\text{mean}} = -4.4$  ‰;  $\sigma=0.9$ ;  $n=12$ ). According to Kinny et al (1999)  $\delta^{13}\text{C}$  values for microdiamonds from the same pipe are from -1.7 to -5.7 ‰ ( $\delta^{13}\text{C}_{\text{mean}} = -3.4$  ‰;  $\sigma=1.3$ ;  $n=10$ ). The same relations between micro- and macrodiamonds was noted for other localities (Reutsky, Zedgenizov, 2001).

The variations in composition of olivines correspond to the magmatic fractionation trend (fig.1). No relations between  $\delta^{13}\text{C}$  of diamonds and petrogenetic fractionation are present.

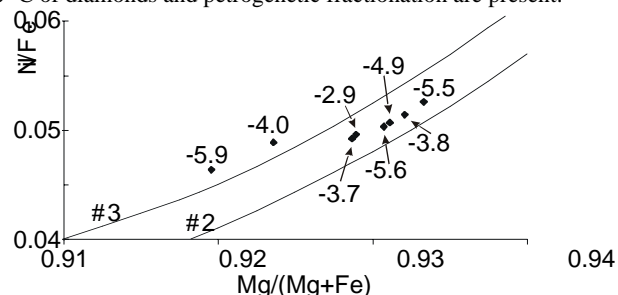


Fig.1. Ni/Fe, Mg/(Mg+Fe) ratio of olivine inclusions and the  $\delta^{13}\text{C}$  of their hosts. Curves #2 and #3 are fractionation trends for different initial Ni/Fe ratios (from Deines et al., 1997).

### Conclusions

Mean  $\delta^{13}\text{C}$  values of diamonds from Yubileynaya pipe is -4.0 ‰ ( $\sigma=1.2$ ;  $n=22$ ). Preliminary, the macrodiamonds are depleted by  $^{13}\text{C}$  relatively to microdiamonds to 1‰.

The composition of olivine inclusions are linked to partial melting process but  $\delta^{13}\text{C}$  of their host diamonds are not linked with petrogenetic processes.

### References

- Deines P., Harris J.W., Gurney J.J., (1997), *Geochim. Cosm. Acta.* **61**, 3993-4005.
- Kinny P.D., Trautman R.L., Griffin B.J., Harte B., (1999), *Proceedings of the 7<sup>th</sup> Int. Kimb. Conf.*, 429-436.
- Reutsky V.N., Zedgenizov D.A., (2001), *Proceedings of the Int. Conf. "Crystallogeneses & Mineralogy"*, St.Peterburg, 318-319.