Trace metals in plants of Chadak gold ore field, Uzbekistan

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Among the set of conditions that determine the status of the biota and the environment in general, geochemical factors related to the geologic history of the area and its constituent chemical composition of rocks and soils play a major role. It is known that the chemical composition of plant communities are closely related to the concentration of some elements in soil. From this perspective, the study of the relationship between the components of geochemical environment is the main objective of our investigation.

The study area is characterized by a relatively developed mining industry, here since 1970 operates the Chadak mine and the gold-extracting factory.

Plant samples (*Artemísia absínthium* and *Phrágmites austrális*) were collected in the vicinity of Chadak mining area and in tailing dumps which were formed as a results of mining activity. Dry ashing was conducted in a muffle furnace at temperatures of 450 to 500^{0}C for 3-4 hours. After the ashing the ashe dissolved in dilute HNO_3+3HCl. The final solution was analized for Cu, Zn, Pb, Mn and As with ICP-MS.

Results show that trace elements were to exceed normal concentration in plant leaves [1] and reaching (mg/kg): Cu – 37-639, Zn – 174-1798, Pb – 5-282, Mn – 361-2969, and As – 2-341, respectively.

As can be seen from the results trace elements are found in excessive or toxic concentration despite the fact, that some of these elements are essential for plants. Not always observed relationship with the soil composition as the concentration of trace metals are much higher than in soil samples. Perhaps this is due to selective ability of some plant species or such high content of trace metals related to ore deposit.

Many studies have shown that there is a correlation of trace metals in plants on the content of their mobile forms in soil solution. With this respect, future investigations on the mobile forms of trace metals are required in our studied area.

[1] Kabata-Pendias, Alina (2011) 4-th ed. *CRC Press*, 505.

Platelet degradation in diamonds. Insights from infrared microscopy and implications for the thermal evolution of cratonic mantle.

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Crystallographic defects in diamonds provide a wealth of information that can, in principle, be used to constrain the thermal evolution of diamond source regions. The simplest method consists of using the average N concentration and aggregation of whole diamonds of known age to obtain an estimate of residence temperature in the mantle. Detailed studies of the spatial dependence of N abundance and aggregation provide an improvement in temperature estimation and can provide constraints on multistage diamond growth events (Kohn *et al.*, in prep). However, temperature estimates can only be obtained if the diamond has been dated by an independent method and the temperature obtained is neither the maximum nor mean temperature experienced during residence in the mantle, because of the exponential temperature dependence in the kinetic equation.

In the present study we are exploring the potential of platelet degradation rate as an additional constraint on thermal histories of diamonds and their cratonic mantle hosts. The approach is to measure nitrogen abundance and aggregation in core-to-rim profiles across diamonds from Argyle (Australia) to determine apparent temperature profiles. These profiles are then compared with the degree of platelet degradation at each point. If platelet degradation occurs at a fixed rate for a given temperature, then for diamonds with a single mantle residence time there should be a clear correlation between the degree of platelet degradation and temperature. Our data show that for a single diamond such a correlation usually exists, but that for the whole data set there are wide variations in the apparent degradation rate. The diamonds with the slowest apparent rates were found to have eclogitic (E) inclusions while those with the fastest rates are peridotitic (P). For Argyle the mantle residence times are around 0.4 and 1.4 Ga for E and P respectively [1], suggesting that the degradation rate could be constant at a given T, and that the different degrees of degradation reflect the different residence times of the two parageneses.

The potential role of plastic deformation and other complicating factors in modifying the calculated temperatures and degree of platelet degradation will also be discussed.

[1] Luguet *et al.* (2009) *Lithos* **112S**, 1096-1108.

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