Rare element minerals within Ditrău alkaline intrusive complex, East Carpathians, Romania

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The Ditrău alkaline intrusive complex is situated within the crystalline rocks of the inner part of the East Carpathians. It has a distinct ring structure and a succession of magmatic events from gabbroic and dioritic magma to syenitic and various postmagmatic events as well, developed between a Triassic extensional stage and a Jurassic rifting stage. The succession of magmatic events in Ditrău could be completed with carbonatite intrusion, that followed after the alkaline intrusion and used the same pathways of the previous alkaline silicate melt. Its affiliation to anorogenic alkaline magmas explains their general feature Nb>>Ta and the predominance of LREE. The Ditrău carbonatite alkaline intrusive complex represents the end of long lasting fractionation processes in the crust and deep upper mantle, respectively. This explains the modest dimensions of Ditrău intrusion and its enrichment with incompatible elements. The high petrographic complexity of Ditrău massif is doubled by a great diversity of mineral occurrences. In addition to the 85 minerals previously mentioned, approximate 200 were recently identified, many of them being first occurrences in Romania.

The rare element minerals which were determined in Ditrău complex intrusion, belong to the following classes (in the predominant order): I. LREE(Y) carbonates: bastnaesite-(Ce), bastnaesite-(La), parisite-(Ce), parisite-(La), synchysite-(Ce), kainosite-(Y); II. Oxide minerals of Nb, Ta, REE(Y), Ti, Zr, Th, U: 1. Pyrochlore group with two subgroup: A. Pyrochlore subgroup: pyrochlore, yttropyrochlore, thorpyrochlore, ceriopyrochlore, bariopyrochlore, uranpyrochlore; B.Betafite subgroup: betafite, yttrobetafite-(Y); Microlite subgroup, with Ta>Nb is absent; 2. Fergussonite group: fergussonite-(Y); 3. Columbite-Tantalite group: ferrocolumbite, mangancolumbite; 4. Aeschynite group: Aeschynite-(Nd), Aeschynite-(Ce), Aeschynite-(Y); 5. Niobian rutile group; 6. Ilmenorutile group; 7. Baddeleyite group; 8. Secondary Th, Ce, U oxides: thorianite, cerianite-(Ce), uraninite; III. REE(Y), Phosphates: REE-apatite, REE-carbonatfluorapatite, monazite-(Ce), brabantite-huttonite, huttonite-monazite series, cheralite, karnasurtite-(Ce), karnasurtite-(Y), xenotime-(Y); IV. Silicates of REE-(Y), Th, Zr, Pb: allanite-(Ce), thorite, Fe-thorite, Fe-Zr-thorite, Pb-thorite, cerite-(Ce), lessingite-(Ce), cevkinite, zircon, Th-zircon; V. Halides class: Y-fluorite; VI. Tellurides class: Bi-Te (hedleyite) and unnamed Bi,Pb-Te. All these rare element minerals belong to the two different mineralization types, localized in two different areas of the Ditrău massif: Jolotca area, of vein type with rare element minerals rich in LREE, Nb, sulphides (pyrite, sphalerite, molibdenite, galena) linked to calcite- ankerite-, dolomite carbonatite in NV of massif, and Belcina area with Y and Th mineralization, less LREE, less sulphides and rich in Fe-oxides and hydroxides, situated outside the massif (towards SE), in the surrounding metamorphic rocks of Tulgheş Group. The Ta content of pyrochlore group in this area is high, but it maintains lower than Nb (Ta<Nb). The Belcina occurrence could be the last later stage, lower temperature carbonatites.

Morphological and spectroscopic features of microdiamond from Chagatay carbonatites (Uzbekistan)

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The new genetic type of diamond connected with carbonatites of Chagatay trachyte-carbonatite complex at the northern slopes of the Southern Nuratau Mts. [1] was discovered at the end of 20th century. By this moment the data about mineralogical particularities of the carbonatitic diamonds are very limited. Here we report for the first time about spectroscopic features of microdiamond enriched from the host rock with the method of thermochemical dissolution. The unique crystal was investigated using optical transparent microscopy, electron scanning microscopy and Raman spectroscopy.

The microdiamond crystal has skeletal habit and size about 50 µm, it is optically transparent and almost colorless with brilliant glance on facets. The crystal has been described with 13th facet variety of octahedron by Shafranovsky I.I. classification.

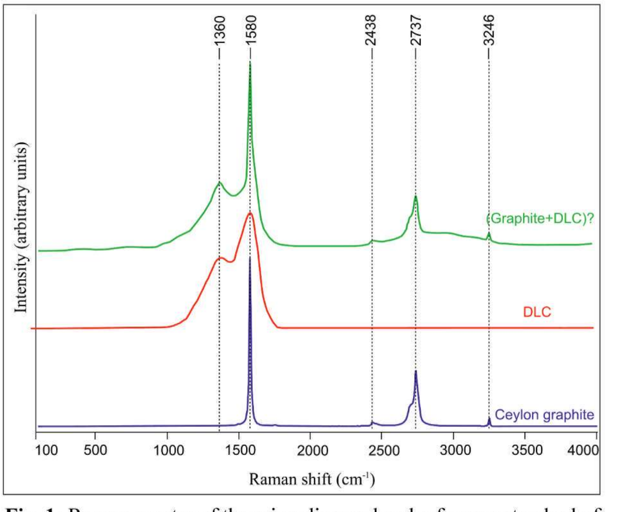

Fig. 1: Raman spectra of the microdiamond and reference standard of DLC and graphite. Raman spectrometer LabRam HR 800 with 488 nm line of external Ar^+ laser was used in this study at room temperature.

Using Raman spectroscopy two main types of spectra were identified. The first type is the spectrum with a peak of 1332 cm^{-1}, which corresponds to the frequency of diamond lattice oscillations at room temperature. The second type of spectrum is additive (Fig. 1, upper) – it consists of overlapping characteristic bands for graphite and DLC (diamond-like carbon). For comparison, reference spectra for the Ceylon graphite and DLC are also shown in the figure.

The received data are very important for understanding of formation mechanism of the new type of origin diamond objects.

[1] Djuraev, A.D. & Divaev, F.K. (1999) in Stanley, C.J. et al. (eds.) *Mineral deposits: Processes to Processing*. Rotterdam, Balkema, 639-642.

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