Discovery of diamond and coesite in Bohemian granulites

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Microdiamond and coesite have been discovered in high-pressure granulites of North Bohemia. The newly found, 5-30 μm sized microdiamonds, documented by micro-Raman, occur as inclusions in garnet, kyanite and zircon. They range from well-formed octahedra in kyanite to ragged sub-rounded crystals in places forming clusters in garnet. Within garnet microdiamond commonly occurs with graphite, which forms also diamond-free aggregates of up to 0.1 mm in diameter with associated phases apatite, rutile, quartz and carbonate minerals whereas in kyanite associated graphite is minor. Diamond occurrence below the surface of the polished section, variable size and morphology and breakdown to graphite confirm the *in situ* origin. Coesite, with a thin rim of quartz, has been identified as an inclusion in kyanite which is itself completely enclosed in garnet, in one of the samples containing polycrystalline quartz aggregates. Thus the north Bohemian crystalline basement is an UHP terrane and it represents a fifth accepted location where diamond has been confirmed *in situ* in continental crust rather than mantle rocks (along with Kokchetav Massif, Kazakstan; Saidenbachtal, German Erzgebirge; Rhodope Massif, Greece and Qinling Mts., China).

The microdiamonds have been found in both felsic quartzofeldspathic and intermediate garnet-pyroxene granulites from exposures in the Eger Crystalline Complex as well as drill cores in the crystalline basement c. 50 km to the ENE. The Saidenbachtal in Central Erzgebirge, belonging to the same Variscan unit, is located c. 50 km to NNE. Whereas the Saidenbachtal diamond-bearing gneiss is an unusual, rare rock [1], our granulites are macroscopically indistinguishable from those covering thousands of square kilometers of the Variscan crystalline core. Garnet peridotites are commonly associated with these granulites. Our discovery indicates that the continental crust was subducted deep into the mantle and captured slices of mantle thus finally yielding an explanation for the long known but still disputed granulite - garnet-peridotite association. Further, it suggests that the Variscan belt may be one of the largest UHP terranes worldwide.

[1] Nasdala & Massonne (2000) *Eur. J. Mineral* **12**, 495–498.

The formation of organic molecules in solar system environments: The Miller-Urey Experiment in space preflight overview

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The *Miller-Urey Experiment in space* (MUE) will investigate the formation of prebiotic organic compounds in the early solar system environment when it is sent to, and later retrieved from, the International Space Station in 2012. The dynamic environment of the solar nebula with the simultaneous presence of gas, particles, and energetic processes, including shock waves, electrical discharges, and radiation may trigger a rich organic chemistry leading to organic molecules. Two gas mixture compositions (CH_4, NH_3, H_2 and N_2, H_2, CO) will be tested and subjected to continuous spark discharges for 48, 96, and 192 hours. Silicate particles will serve as surfaces on which thin water ice mantles can accrete. The experiment will be performed at low temperatures (-5 °C), slowing hydrolysis and improving chances of detection of initial products, intermediates and their abundances. Conducting the Miller-Urey experiment in the space environment (microgravity) allows us to simulate conditions that could have prevailed in the low gravity, energetic early solar nebula and provides insights into the chemical pathways that may occur as planetary systems form.