THE RIES IMPACT DIAMONDS (RIDs): STILL OPEN OR POORLY-STUDIED QUESTIONS

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Introduction: Earlier [1, 2] we presented a brief summary on the main RIDs features including their origin conditions. Below there are some open or poorly-studied questions on the topic.

A brief list of the questions is as follow:

1) A presence of coal-derived RIDs. The RIDs can originate from the coal layers known in Cenozoic member of the Ries target. Remnants of distal (moldavite strewn fields) and proximal (suevites) impactoclastic layers may contain these RIDs.

2) A rarity of xenomorphic graphite-derived RIDs. The rarity seems unusual comparing to other astroblemes (Popigai, etc.), where this type of diamond is very common. In general, flattened IDs are the result of shock transformation (+45% volume decrease fragmentation) of thin/small graphite plates, whereas the same action for thick/large graphite aggregates resulted in origin of xenomorphic IDs [3]. The rarity of xenomorphic RIDs is due to either the parental graphite features (only thin and small well-shaped plates dominate in target gneisses?) or the result of incomplete study of the Ries diamond-bearing impactites.

3) A lack of RIDs in the Ries tagamites. This lack seems also unusual comparing to Popigai and other diamond-bearing astroblemes. Large bodies of diamond-bearing tagamites in these astroblemes failed to provide full thermo-chemical diamond elimination here. So, a lack of RIDs in Ries tagamites is of a special interest, especially in case if graphite is present in these rocks.

4) A perspective of new data in carbon shock mineralogy. Complex (diamond+lonsdaleite+chaoite) paramorphs with the presence of diamond-like amorphous carbon are shock–derived from the Ries (and the Popigai also) parental graphites [3–5]. A number of new high pressure–temperature carbon phases, both confirmed and supposed are listed in [6, 7]. Some of the phases can be of shock origin, and their quest and study in association with RIDs is of a great importance. New dense carbon phase found in Ries [5] is of a special interest in this aspect. Recent data [8] contribute to this promising but still poor-studied field of carbon shock mineralogy. Question on chaoite is also still open: this carbine-like mineral may be a mixture of α– and β–carbines.

5) An origin of "CVD-diamonds". Data by [9] show that Homogenous Nucleation, HN, in expanding plasma fireball is a more real origin process for this type of RIDs than CVD scenario by [10]: HN has no limitations common for the CVD–process.

Conclusion: The questions presented may serve as a subject for forthcoming studies important not only for origin of the RIDs themselves but for the shock mineralogy of carbon system at all.

References: [1] Vishnevsky S, Palchik N. (2010) *Nördlingen-2010, Print–only section,* Abstract #7006. [2] Palchik N., Vishnevsky S. (2010) *Nördlingen–2010, Ibiddem,* Abstract #7007. [3] Vishnevsky S., et al. (1997) *Impact Diamonds: their features, origin & significance.* Novosibirsk: SB RAS Press. 110 p. (in Russian & English). [4] Lapke C., et al. (2000) *MAPS, 35,* A95. [5] El–Goresy A., et al. (2001) *American Mineralogist, 86,* 611–621. [6] Valter A., et al. (1992) *Shock-metamorphic carbon minerals.* Kiev: Naukova Dumka. 172 p. (in Russian). [7] Shumilova T. (2003) *Mineralogy of native carbon.* Ekaterinburg: URB RAN. 316 p. (in Russian). [8] Ferrior T., et al. (2010) *EPSL, 290,* 150–154. [9] Burki P. (1996) *MAPS, 31,* A24–A25. [10] Hough R., et al. (1995) *Nature, 378,* 41-44.