

. . . , . . .
677980, . . . , 39
E-mail: shkodzinskiy@diamond.ysn.ru
28 2005 .

II-VII

GENESIS OF DIAMOND IN KIMBERLITES AND LAMPROITES

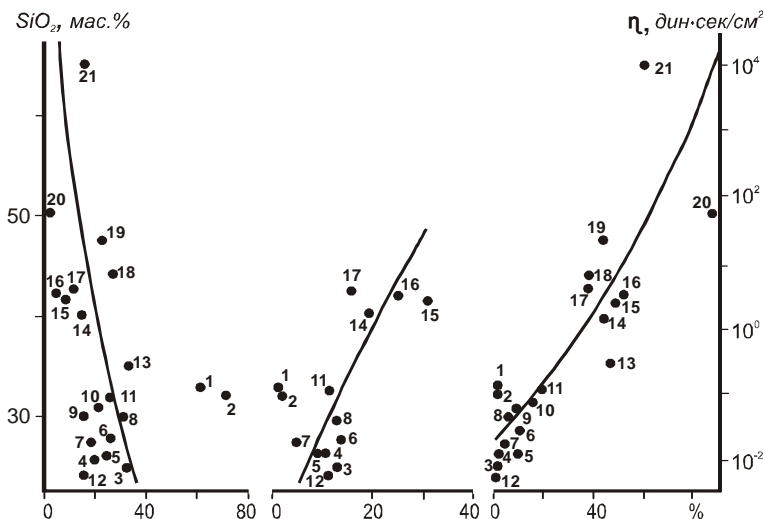
V.S. Shkodzinskiy, A.I. Zaitsev

Institute of Diamond and Precious Metals Geology, Siberian Branch of RAS

Presence of melt inclusions in the diamonds from kimberlites and lamproites, coexistence of peridotite and eclogite parageneses in some diamond crystals, the differences of internal diamond structure from kimberlite and mantle xenoliths, new data about protogenetic origin of majority of high temperature inclusions in diamonds, syneruption isotope age some inclusions in diamonds and other data contradict hypothesis of xenogenous origin of the diamonds in mantle peridotites and eclogites and testify to crystallization of majority of them during deep stage of evolution of kimberlite and lamproite melts. These conclusions are conforming with decrease of proportion of octahedrons and increase of round crystals and varieties II-VII (according to Orlov's classification), if SiO₂ content in magmatic rocks is increasing.

Key words: *diamonds, kimberlites, lamproites, mantle, crystal morphology.*

XIX - [, 1939] -



16 – , 17 – , 18 – ; 19 – , 20 – , 21 – . [, 1997; , 2003; , 2004; , 1998; , 2004; , 2001].

(2-14 %) [Arima et al., 1993], 1800- (. 1). 2000 70-77 . 0 20 % 38-52 % 4,74 41,76 % [, 1997]. 1, 60- 86 % (. 1). (35-45 % SiO₂) (40 – 52 % SiO₂) [, 2000],

[, 1993],
 ; 4)
 [, 1982]
 [, 2003].
 [, 1976].
 [, 2001;
 , 2003].
 4-2,8
 3,3-1,7
 1,7-0,6
 [, 2001;
 , 2003].
 (2,2 2,8 / ³)
 4 1,9
 2,6 0,6
 (2000)
 [, 1993].

[, 1991].

[, 1995]

)

(

$$\begin{aligned}
 & + + 4' 2 + 2 \rightarrow < 2^+ < 4' 2^+ \\
 & 4' 2 - \\
 & , < 2^- \\
 & , < 4' 2^-
 \end{aligned}$$

(2000)

[, 1995]

[Arima et al., 1993],

1800-2000

[1993; Spetsius, Taylor, 2003]

. [1993] (6,1 .% , 2000. 264 .
 7) (3,5 .%, , 1993. 168 .
 3). , , 1997. 575 .
 , 1976. 284 .
 23 ‰ //
 [, 1989]. , 1937. .17. 8. .413-418.
 (δ¹³ : - , 1991. 240 .
 -1 -10 ‰) (+2,5- -35 ‰). « » //
 .1964. 18. .3. .361-367.
 //
 2001. 6. .6-9.
 , 2003. 603 .
 //
 2002. 1. .5-121.
 , 2004.
 226 .
 // .1939 .8. .10. .1519-1534.
 //
 .250-252. // .1956. .85. .2. 2004. .207-210.
)- //
 // .1978. .238. 3. .695-699.
 - : - , 2004. .43-46. , 1982. 334 .
 //
 , 1991. 172 . , 1993. .216-225.

- , 1963. 235 .
- / , 1976. 1006 .
- . 1993. 6. . 56-64.
- // -
- . 1998. . 39. 12. .
- 1693-1703.
1989. 590 .
- , 2001. 324 .
- // « » ()
- : , 2004. . 380-383.
- : , 1995. 168 .
- : , 2003. 240 .
- Arima M., Nakayama K., Akaishi M.* Crystallization of diamond from a silicate melt of kimberlite composition in high-pressure and high-temperature experiments // *Geology*, 1993. V. 21. . 968-970.
- Beard B.L., Taylor L.A., Scherer E.E. et al.* The Source region and melting mineralogy of high-titanium and low-titanium lunar basalts deduced from Lu-Hf isotope data // *Geochim. Cosmochim. Acta.* 1998. V. 62. P. 525-544.
- Bulanova G.P.* The formation of diamond // *J. Geochem. Explor.* 1995. V. 53. P. 1-23.
- Burgess R., Turner G., Harris J.W.* ^{40}Ar - ^{39}Ar laser probe studies of clinopyroxene inclusions in eclogitic diamonds // *Geochim. Cosmochim. Acta.* 1992. V. 56. P. 389-492.
- Hamilton M.A., Sobolev N.V., Stern A.R., Pearson D.G.* Shrimp U-Pb dating of perovskite inclusions in diamond: evidence for a syneruptive age for diamond formation, Sytykanskaya pipe, Yakutia region, Siberia // 8th Kimberlite Conf. Long Abstract. Victoria, Canada, 2003.
- Klein-BenDavid O., Izraeli E.S., Navon O.* Mantle fluid evolution – a tale of one diamond // 8th Kimberlite Conf. Select. Papers. 2004. V. 2. P. 243-253.
- Meyer H.O.A.* Inclusions in diamonds // *Mantle Xenoliths* / P.H. Nixon (ed). Wiley, 1987. P. 501-523.
- Pearson D.G., Shirey S.B., Bulanova G.P. et al.* Re-Os isotope measurements of single of sulphide inclusions in a Siberian diamond and its nitrogen aggregation systematics // *Geochim. Cosmochim. Acta.* 1999. V. 63. P. 703-711.
- Richardson S.H., Shirey S.B., Harris J.W.* Episodic diamond genesis at Jwaning, Botswana and implications for Kaapvaal craton evolution // 8th Kimberlite Conf. Select. Papers. 2004. V. 2. P. 143-154.
- Shimizu N., Sobolev N.V.* Young peridotitic diamonds from the Mir kimberlite pipe // *Nature.* 1995. V. 375. . 394-397.
- Spetsius Z.V., Taylor L.A.* Metasomatic diamonds in eclogite xenoliths: petrologic and photographic evidence // 8th Kimberlite Conference Long Abstract. Victoria, Canada, 2003.
- Sunagava I.* Materials science of the Earth's interior. Tokio, 1984. 653 p.
- Taylor L.A., Anand M.* Diamonds: time capsules from the Siberian Mantle // *Chemie der Erde.* 2004. B. 64. S. 1-74.
- Wood J.A., Diskey J.S., Marnin V.B., Powel B.H.* Lunar anorthosits and geophysical model of Moon // *Proc. Appolo XI Lunar Sci. Conf. Houston.* 1970. V. 1. P. 965-989.