ON THE POSSIBILITY OF FORMATION OF THE CHONDRITE
DIAMONDS IN THE NON-EQUILIBRIUM PROCESS. A.V.Fisenko,
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The diamonds of chondrites have presolar origin, but
the process of their formation is discussed. We report
the results of X-ray and differential thermal analyses
(DTA) of the Efremovka chondrite diamond-rich fraction
(DE-4). Diamonds in this fraction are not contamination
origin since they contain the isotopically anomalous Xe-X
/1/. Besides the fraction DE-4 diamonds of different ge-
nesis have also been analyzed : natural diamonds ND 3/2
(particles range 2-3 μm); synthetic diamonds SD 1/0, ob-
tained under static conditions (particles range 0-1 μm);
submicro-and micropowders of UDD and DDG diamonds synthe-
sized by the detonation method from carbon of explosive
in gaseous phase and graphite, respectively.
    The sizes of the coherent scattering region (CSR) of
the investigated diamonds were calculated (Table) accor-
ding to extendsion of lines on X-rayogram.

Table. Parameters of the diamond samples

Parameters		Diamond samples				
		ND 3/2	SD 1/0	DDG	UDD	DE-4
Size of CSR, $\overset{o}{A}$	Calculated values	–	860	110	35	30
	References /2,3/	2000	n.d.[x]	75	40	n.d.
Mean size of particles, $\overset{o}{A}$		6100	1150	630	50	26-30

[x] not determined

Mean size of diamond particles calculated according to
their specific surface /4/ are also given in the Table
with the exception of DE-4. For latter we used the same
size of diamonds as for Murchison chondrite /5/.
    It is seen from Table that for Efremovka chondrite
diamonds the sizes of CSR and the mean size of particles
agree with each other. From this follow chondrite diamonds
are monocrystalline. DTA-curves of diamonds air oxidation
were recorded in range from 20°C to 950°C. Intensive oxi-
dation of diamond particles was recorded in the form of
sharp single peak at ~583°C. Not less than 90% of the dia-
monds was oxidized over the range from 350°C to 630°C.
On the basis of the oxidation exotherm follow the sample
DE-4 is homogeneous on grain size powder. The Efremovka

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chondrite diamonds agrees to a considerable degree with UDD in particle sizes, their monocrystalline and of the thermal oxidative stability. Based on this, we are proposed that the Efremovka chondrite diamonds could be formed from carbon in a gaseous phase at the fast non-equilibrium process as well as the UDD. The condensation of diamond particles may be initiated and enhanced in shock waves, e.g. in the star wind emitted from O,B-star in early stages of core He-burning. In this stage of the star evolution a gas phase had C/O>1 /6/. The isotopic data on carbon and nitrogen for the diamonds of chondrites correspond also to the nuclear process proceeding in the mentioned stage. The possibility of the formation of the diamond nucleations in the star atmosphere in shock waves was pointed out earlier /7/. However, the authors of this work are supposed diamond nucleus served as substrates for the further epitaxial growth of interstellar diamonds. From our data it follow that the fast non-equilibrium process has played a main role in the formation of the chondrite diamonds. By confirm of this one may indicate, e.g. that the diamonds of chondrites have a considerable amount of nitrogen (up to ~0.9 wt.%), pointing to the non-equilibrium process of nitrogen incorporation into diamonds /8/. It is may be proposed that the considerable amount of carbon atoms on the non-equilibrium formation of diamond particles is replaced by nitrogen that gives its large content in diamonds.

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