SHOCK-MELTED IMPACTITES AT THE SVETLOYAR METEORITE CRATER VOLGA AREA, RUSSIA

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Introduction: Pumices found at the Svetloyar meteorite crater provide additional evidence for the impact genesis of this structure.

Svetloyar impact crater: The Svetloyar ring structure, which is now filled with a relatively small lake and is located in Voskresensk district of Nizhnii Novgorod oblast in central Russia, (45° 47` N, 45° 05` E), was first identified as a meteorite crater in 2000 [1], although ideas about such a genesis of the structure were expressed earlier. The lake is slightly elongated from north to south and is relatively small: 450 by 350 m at a depth of 25-30 m. It is surrounded by a wall, whose maximum height reaches 20-25 m. The area of the lake consists of Triassic red beds overlain by glacial deposits. Triassic rocks underlyin by argillaceous and carbonaceous Permian sediments. At the same time, the wall around the lake (up to 100 m wide) contains abundant fragments of Triassic and Permian siltstones, sandstones, and limestones mixed with glacial clays and overlying them, as is clearly seen in the southwestern part of the lake. These detrital rocks are allogenic breccias and compose the wall and ejecta outside the crater.

Pumices: The shock-melted impactites (pumices) were found around a creek cutting through the southwestern part of the wall. These are porous black or dark gray rocks with numerous small (from a few fractions of a millimeter to a few millimeters across) fragments of Triassic and Permian rocks.

Results of chemical analyses and discussion: Analyses (made on a CamScan 4DU scanning electron microscope equipped with a Link 10 000 analytical system) of glasses from the pumices revealed their compositional heterogeneity, a fact suggesting that the melt was poorly stirred and homogenized. These rocks have no compositional analogues among volcanic rocks. The arrangement of their composition data points the in diagrams from [2]

indicates that the rocks were produced by the melting of clay-sand rocks (table, analyses 3 and 4), often with an appreciable admixture of carbonate material (table, analyses 1 and 2). This is in good agreement with chemical composition of target rocks and is additional arguments for the impact genesis of this ring structure.

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References: [1] Kiselev A.K. (2000) *Meteoritic genesis of Svetloyar lake, Int. Conf. "Cosmic Defense of the Earth"*. Abs. Eupatoria, Ukraine, p. 46 (in Russian). [2] Shuldiner V.I. (1982) *Precambrian basement of the Circumpacific Belt and neighboring platforms*, Moscow, Nedra, 226 pp. (in Russian).

Table 1. Chemical analyses of pumices of the Svetloyar meteorite crater

	an. 1	an. 2	an. 3	an. 4
SiO_2	64.74	60.72	72.10	65.29
TiO_2	0.66	1.01	0.70	0.00
Al_2O_3	7.04	11.23	13.61	23.45
FeO	3.10	3.94	1.61	2.75
MnO	1.18	0.89	0.00	0.00
MgO	2.44	0.66	0.72	1.42
CaO	3.96	8.66	0.18	1.79
Na_2O	3.67	0.97	0.84	1.85
K_2O	12.29	6.95	9.83	3.18
P_2O_5	0.77	4.86	0.21	0.00
S	0.00	0.00	0.18	0.00