Table 1

Central zone, test No. 1		Central zone, test No. 2		Monoclinic ZrO_2		Rhombic ZrO_2		Central fritting zone		Original zircon	
I	d_α/n, Å	I	d_α/n, Å	I	d_α/n, Å	I	d_α/n, Å	I	d_α/n, Å	I	d_α/n, Å
		2	4.47					1	4.45	1.5	4.47
0.5	3.62	3	3.67 *	3	3.67	w	3.66				
		7	3.32					9	3.32	10	3.31
10	3.13	10	3.16	10	3.16						
1	2.92 *	5	2.94 *			s	2.97				
8	2.81	8	2.84	8	2.83						
1	2.62 *	2	2.64 *	6	2.61	av	2.63	0.5	2.66	0.5	2.66
0.5	2.52	4	2.53	4	2.54	w	2.55	9	2.53	2	2.53
								1	2.35	1	2.34
1	2.19	2	2.21	5	2.20			0.5	2.23		
		2	2.07			vw	2.08	5	2.08	1	2.07
0.5	2.00	1	2.03	1	2.03						
								3	1.92	0.5	1.92
2	1.83 *	3	1.84	6	1.84	av	1.83				
5	1.80 *	3	1.81 *	6	1.81	av	1.80				
								2	1.76	1	1.76
		3	1.72 *			w	1.72	10	1.72	2	1.72
1	1.69	2	1.69	5	1.69	w	1.70	0.5	1.70		
2	1.65	3	1.66	5	1.65	w	1.66	6	1.66	2	1.65
1	1.58 *					av	1.58				
								0.5	1.56		
2	1.54					av	1.54				
								0.5	1.51		
1	1.47	2	1.47	3	1.47	av	1.48	3	1.49	1	1.48
2	1.41					vw	1.42	8	1.39	1	1.38
						vw	1.39	2	1.37	1	1.36
1	1.32	1	1.33					1	1.30	0.5	1.29
								2	1.27		

Note: Operating conditions: 1—Co, 10 ma, 37 kv, URS—70; 2—Cu, 5 ma, 37 kv, URS—50 IM; 3—No. 275 of [18]; 4—of [19]; 5—Co, 10 ma 40 kv, URS—55; 6—Cu, 5 ma, 37 kv, URS—50 IM. Asterisks mark lines possibly representing rhombic ZrO_2 (test No. 1) or tetragonal ZrO_2 (test No. 2).

metamict minerals and has long been studied in this respect [12-15]. There are also experimental diagrams for the system SiO_2-ZrO_2 [16, 17]. The original zircon had an ω of 1.925 and was a powder of pale yellow transparent grains, 0.1 0.2 mm in size, from the Lower Cretaceous of the Kiya River basin (western Siberia). The zircon was fresh and almost unaffected by metamict decay. All tests were made in steel ampoules with an inner cavity 40 mm in length and 5 mm in diameter. The explosive used was poured hexogen with a weight of 80, 100 and 150 g. After pressing, the following same three zones were observed in all ampoules regardless of the charge weight: 1) axial, 2) intermediate, 3) outer (in cross section). The diameter and extent of zones along the ampoule do not vary substantially with the charge weight. Outer zone three is fully consistent in its X-ray pattern and refractive index with the original zircon (ω = 1.924). Zone two is a vitreous sintered, somewhat heterogenous substance ranging from dark to colorless and glass-clear. The boundary between zones two and three is so indistinct that an intermediate zone two to three is recognizable. As can be seen from the X-ray patterns in Fig. 1, the principal lines become less intense and certain weak lines of long-range order ($2\theta > 70°$) disappear on passing from zone three to zone two, but the intensities of some other weak lines increase. Zone two also exhibits the weak ZrO_2 lines characteristic of axial zone one. At the same time, in zone two, the refractive index of zircon decreases somewhat to 1.916. Studied preliminarily by M. Ya. Shcherbakova and V. A. Solntsev, the electron paramagnetic resonance spectra showed that the number of lattice flaws decreased from zone three to zone two, and that the electron paramagnetic resonance spectrum of zone two was qualitatively analogous to that of natural, partly metamict zircon. All these effects are analogous to the metamict conversion of zircon, although the degree of conversion is not very great.

Axial zone one (cord), ~ 1 mm in diameter, is a metal-gray substance consisting mainly of crystalline ZrO_2 and amorphous SiO_2. The X-ray pattern (Fig. 1, Table 1) corresponds