Tazheranite $(Zr, Ti, Ca)O_2$

Crystal Data: Cubic. *Point Group:* $4/m\ \bar{3}\ 2/m$, $\bar{4}3m$, or 432. Anhedral crystals, thick tabular, may be rounded, to 1.5 mm, and as irregular grains.

Physical Properties: *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 7.5
D(meas.) = 5.01(2) D(calc.) = [5.03]

Optical Properties: Semitransparent. *Color:* Yellowish orange to reddish orange, rarely cherry-red, then zoned, brownish green; in thin section, pale yellow, zoned with a reddish tint.
Luster: Adamantine to greasy on fractures.
Optical Class: Isotropic; may exhibit weak to strong anisotropism, centrally zoned. $n = 2.25(2)$

Cell Data: *Space Group:* $Fm3m$, $F\bar{4}3c$, or $F432$. $a = 5.108(1)$ $Z = 4$

X-ray Powder Pattern: Tazheran massif, Russia.
2.94 (10), 1.804 (10), 1.539 (10), 2.55 (6), 1.171 (5), 1.044 (5), 0.9828 (5)

Chemistry:

	(1)
SiO_2	0.63
TiO_2	2.42
ZrO_2	67.67
Ti_2O_3	11.65
Al_2O_3	4.61
Fe_2O_3	0.92
MgO	2.38
CaO	9.97
Total	100.25

(1) Tazheran massif, Russia; after deduction of spinel 5.41% and forsterite 1.48%, corresponds to $(Zr_{0.59}Ca_{0.19}Ti^{3+}_{0.18}Ti^{4+}_{0.03}Al_{0.02}Fe_{0.02})_{\Sigma=1.03}O_{1.74}$.

Occurrence: In calciphyres banding periclase-brucite marble xenoliths in an alkalic massif (Tazheran massif, Russia).

Association: Spinel, forsterite, åkermanite–gehlenite, clinohumite, ludwigite, azoproite, magnesioferrite, calzirtite, baddeleyite, geikielite, perovskite, rutile, zircon, dolomite, calcite (Tazheran massif, Russia).

Distribution: In the Tazheran alkalic massif, west of Lake Baikal, eastern Siberia, Russia. On Alnö Island, Sweden. From the Jacupiranga carbonatite, São Paulo, Brazil.

Name: For the Tazheran massif, Russia, where it was first noted.

Type Material: Mining Institute, St. Petersburg, 1094/1; A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 72602, vis5748; National Museum of Natural History, Washington, D.C., USA, 145796.

References: (1) Konev, A.A., Z.F. Ushchapovskaya, A.A. Kashaev, and V.S. Lebedeva (1969) Tazheranite, a new calcium-titanium-zirconium mineral. Doklady Acad. Nauk SSSR, 186, 917–920 (in Russian). (2) (1970) Amer. Mineral., 55, 318 (abs. ref. 1). (3) Kashaev, A.A. and Z.F. Ushchapovskaya (1969) Tazheranite – a mineral with CaF_2−type structure. Kristallografiya (Sov. Phys. Crystal.), 14, 1064–1065 (in Russian). (4) Neder, R.B., F. Frey, and H. Schulz (1990) Defect structure of zirconia ($Zr_{0.85}Ca_{0.15}O_{1.85}$) at 290 and 1550 K. Acta Cryst., A46, 799–809.