Azoproite $(Mg, Fe^{2+})_2(Fe^{3+}, Ti, Mg)BO_5$

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. As prismatic crystals, often striated and skeletal, to 2 cm, typically poorly terminated, with a diamond-shaped outline on {001}.

Physical Properties: *Cleavage:* On {010}, good, may be a parting; on {001}, distinct. *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = ∼5.5 D(meas.) = 3.63(2) D(calc.) = [3.63] Paramagnetic.

Optical Properties: Translucent to nearly opaque; transparent in thin section. *Color:* Black. *Luster:* Adamantine.
Optical Class: Biaxial (+). *Pleochroism:* Strong; X = pale bluish green; Y = dark green; Z = brownish red. *Absorption:* $Z > Y > X$. $\alpha = 1.799(2)$ $\beta = 1.822(3)$ $\gamma = 1.855(5)$ 2V(meas.) = $> 70°$ 2V(calc.) = 80°

Cell Data: *Space Group: Pbam.* $a = 9.26(1)$ $b = 12.25(1)$ $c = 3.01(1)$ Z = 4

X-ray Powder Pattern: Tazheran massif, Russia.
2.52 (10d), 5.07 (8), 2.16 (6), 2.02 (6), 2.77 (5b), 2.11 (5), 1.900 (5)

Chemistry:

	(1)
TiO_2	15.40
B_2O_3	19.07
Fe_2O_3	16.01
FeO	5.16
MnO	0.11
MgO	45.01
Na_2O	trace
Total	100.76

(1) Tazheran massif, Russia; after deduction of calcite, spinel, forsterite, corresponds to $(Mg_{1.82}Fe^{2+}_{0.13})_{\Sigma=1.95}(Fe^{3+}_{0.37}Ti_{0.36}Mg_{0.25})_{\Sigma=0.98}B_{1.02}O_{5.00}$.

Mineral Group: Ludwigite group.

Occurrence: An uncommon late-stage mineral in the border zone in magnesian contact-metamorphic rocks associated with syenites; the deposit is estimated to contain 350 kT B_2O_3.

Association: Calcite, ludwigite, brucite, clinohumite, baddeleyite, tazheranite, perovskite, geikielite, forsterite.

Distribution: From the Tazheran alkalic massif, west of Lake Baikal, eastern Siberia, Russia.

Name: A Russian acronym honoring the Study of Deep Zones of the Earth's Crust (AZOPRO in Russian) sponsored in 1969 by the International Geological Association.

Type Material: Mining Institute, St. Petersburg, 1481/1–1481/3; A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 72890–72892; Natural History Museum, Paris; National School of Mines, Paris, France, V16383.

References: (1) Konev, A.A., V.S. Lebedeva, A.A. Kashayev and Z.F. Ushchapovskaya (1970) Azoproite, a new mineral of the ludwigite group. Zap. Vses. Mineral. Obshch., 99, 225–231 (in Russian). (2) (1971) Amer. Mineral., 56, 360 (abs. ref. 1).