Reidite $Zr(SiO_4)$

Crystal Data: Tetragonal. *Point Group*: 4/*m*. As elongate skeletal crystals to 10 mm.

Physical Properties: *Cleavage*: None. *Fracture*: Even. *Tenacity*: Brittle. Hardness = ~7.5
D(meas.) = n.d. D(calc.) = ~5.2

Optical Properties: Transparent. *Color*: White in reflected light; pale brownish green in transmitted light. *Streak*: White. *Luster*: Adamantine.
Optical Class: Uniaxial (+). $n >> 1.64$. Parallel extinction and length slow.

Cell Data: *Space Group*: $I4_1/a$. $a = 4.738(1)$ $c = 10.506(2)$ Z = 4

X-ray Powder Pattern: ODP Site 904, New Jersey continental shelf, USA.
2.81 (100), 1.755 (60), 2.065 (50), 1.441 (50), 1.55 (45), 4.30 (40), 3.29 (40)

Chemistry:

	(1)
SiO_2	31.44
ZrO_2	65.92
HfO_2	1.25
TiO_2	0.06
FeO	0.09
Al_2O_3	0.01
MgO	0.09
Total	98.86

(1) Impact ejecta layer, USA continental shelf; average of 5 electron microprobe analyses; corresponds to $(Zr_{1.01}Hf_{0.01})Si_{0.99}O_4$.

Polymorphism & Series: A quenchable high-pressure polymorph of zircon.

Occurrence: Epitaxially oriented in shock-metamorphosed zircons in an impact ejecta layer in marine sediment on the upper continental slope; detrital in clastic sedimentary rocks.

Association: Impact glass (tektites), shocked quartz and feldspar with multiple sets of planar deformation features, coesite, stishovite.

Distribution: From the USA upper continental slope off New Jersey (Deep Sea Drilling Project Site 612, Hole 903C, and Hole 904A) and off Maryland (Deep Sea Drilling Project Site 1073 Hole A). On Barbados at Bath Cliff. From numerous impact structures, including the Woodleigh impact structure (Western Australia); the Vredefort impact structure (South Africa); Meteor Crater, (Arizona) and Rock Elm impact crater (western Wisconsin), USA; and the Haughton impact structure on Devon Island, Nunavut, Arctic Canada. From the Stac Fada impactite, collected near Stac Fada sea stack, north side of the Bay of Stoer, Scotland. Within Muong Nong-type tektites from Thailand.

Name: Honors Alan F. *Reid* who first produced this phase in the laboratory.

Type Material: National Museum of Natural History, Washington, D.C., USA (NMNH 173504).

References: (1) Glass, B.P., S. Liu, and P.B. Leavens (2002) Reidite: An impact-produced high-pressure polymorph of zircon found in marine sediments Amer. Mineral., 87, 562-565.
(2) Stangarone, C., R.J. Angel, M. Prencipe, B. Mihailova, and M. Alvaro (2019) New insights into the zircon-reidite phase transition. Amer. Mineral., 104, 830-837. (3) Reddy, S.M., T.E. Johnson, S. Fischer, W.D.A. Rickard, and R.J.M. Taylor (2015) Precambrian reidite discovered in shocked zircon from the Stac Fada impactite, Scotland. Geology, 43(10), 899-902.