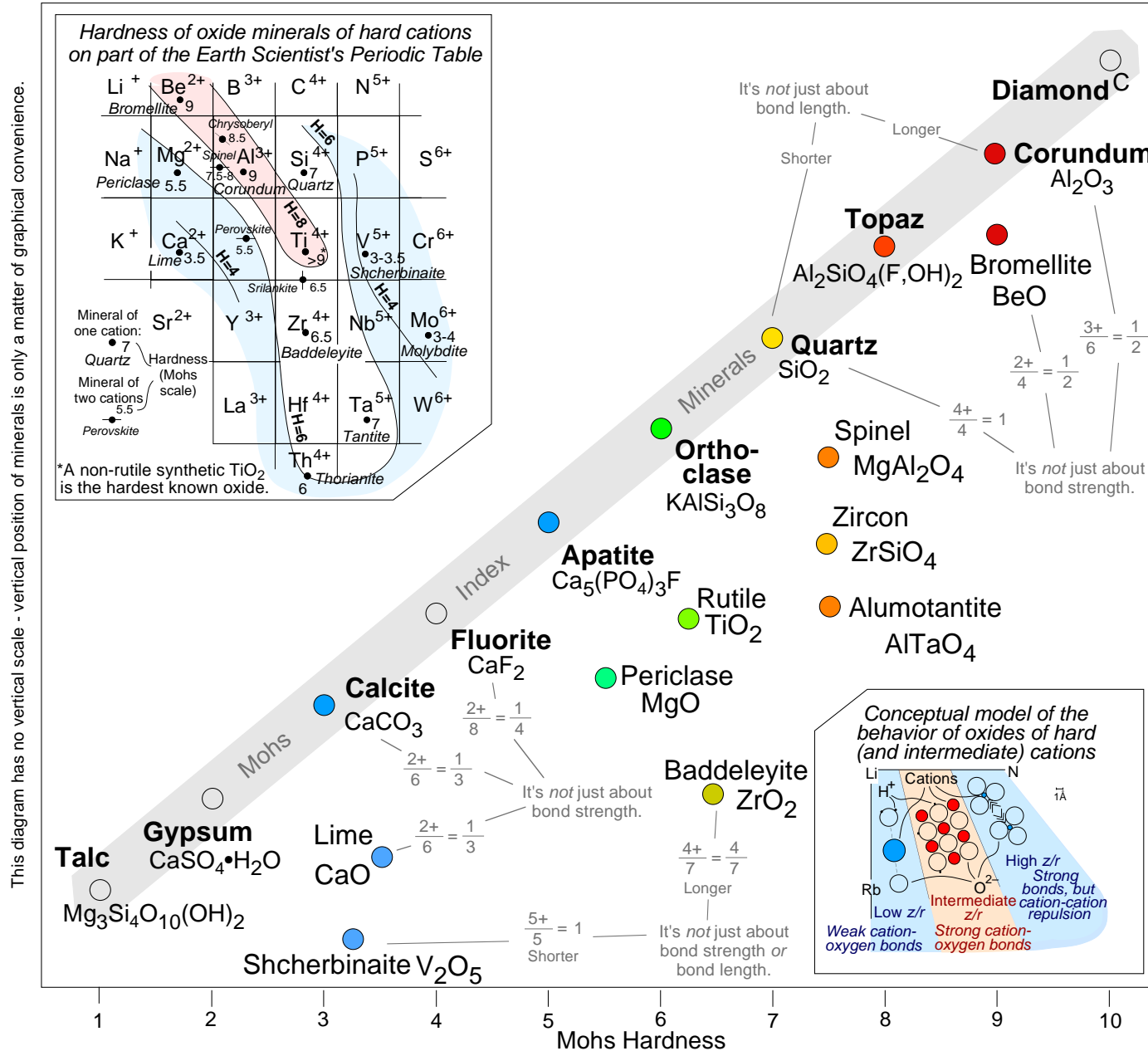


Hardness of minerals Va: variation among oxides and oxysalts



If the previous pages of this series have explained the hardness of the hardest and softest minerals in the Mohs Scale, it has done little for the minerals in between. Those minerals in between are mostly oxides and oxysalts. Hardness of oxides shows the same trend as that of melting temperature and solubility when plotted on a periodic table: the greatest values fall in a fairway from Be²⁺ to Zr⁴⁺ (see the inset at upper left). This trend seemingly exists because the cations of intermediate ionic potential found in that fairway have sufficient density of charge to bond strongly to O²⁻ without suffering mutual repulsion of their positive charges (see the inset at lower right). Thus corundum and bromellite, the minerals incorporating the small cations most centrally in this pink fairway, have the greatest hardness among these oxide and oxysalt minerals. Topaz incorporates a little Si⁴⁺ and so is a little softer. At the other extreme from corundum, calcite incorporates Ca²⁺ and C⁴⁺, well off the fairway into the blue, and so is a soft mineral. For more, see Part Vb of this series.

Hardness data are from Nickel, E.H., and Nichols, M.C., 1991, *Mineral Reference Manual*: New York, Van Nostrand Reinhold, 250 p. Insets are from Railsback's *Earth Scientist's Periodic Table of the Elements and Their Ions*.