

Feldspars and feldspathoids III: The feldspars of large cations

The last page of this series will argue that there is a limit to how small the cations can be that fill the interstitial spaces in feldspars. However, large size is seemingly not an issue, so that there are feldspars, or feldspar analogs, containing the large cations that reside below Na⁺, K⁺, and Ca²⁺ in the periodic table.

Let's begin with the chemical formula for quartz, the most familiar silica mineral.



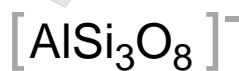
Let's quadruple that formula.



Li ⁺	Be ²⁺	B ³⁺	C ⁴⁺
Na ⁺	Mg ²⁺	Al ³⁺	Si ⁴⁺
K ⁺	Ca ²⁺	Sc ³⁺	Ti ⁴⁺
Rb ⁺	Sr ²⁺		
Cs ⁺	Ba ²⁺		

Common Feldspars
Rare feldspars

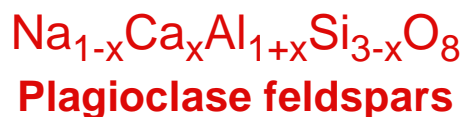
Bearing in mind that Al³⁺ is an abundant cation near in size to Si⁴⁺, let's substitute one Al³⁺ for one of the Si⁴⁺.



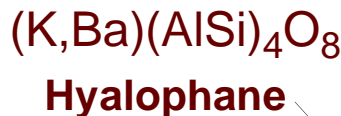
and



and



and



Hyalophane is nominally a K-Ba analog of the Na-Ca plagioclase compositional intermediates, but its range of compositions is much smaller and it is much less common.



Larger 2+ cations can also fit in the feldspar structure to make the two much less common feldspars at left.

The geometry of the tectosilicate structure will allow a second interaction of this substitution, to give the unbalanced formula at left.

For more on the common feldspars shown here, see Part II of this series.

Rubcline is a Rb-rich analog of microcline, and it additionally contains some Cs⁺.