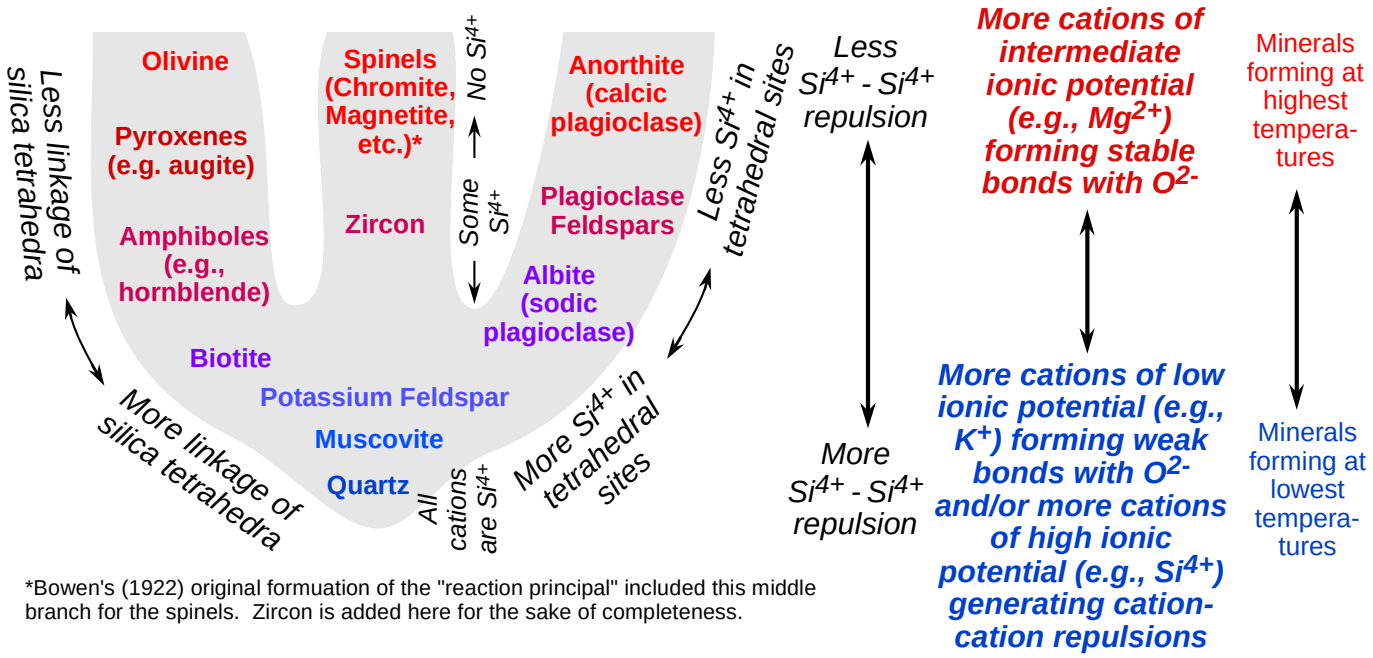
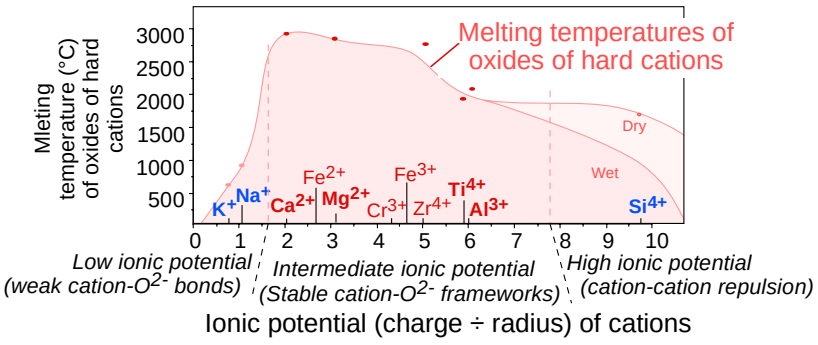
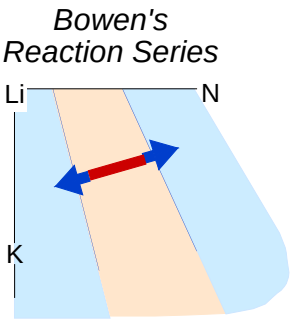
Bowen's Reaction Series V: A summary explanation

This is the fifth of five pages explaining the order of the minerals in Bowen's Reaction Series. The usual first minerals to form are those rich in cations of intermediate ionic potential, which bond strongly to O^{2-} but don't have such highly focused charge that they set up cation-cation repulsions. The usual later, or lower-temperature, minerals either have cations of low ionic potential, which only bond weakly to O^{2-}, and/or they have the cation of high ionic potential, Si^{4+}, which generates cation-cation repulsions that destabilize their mineral structures at higher temperatures.

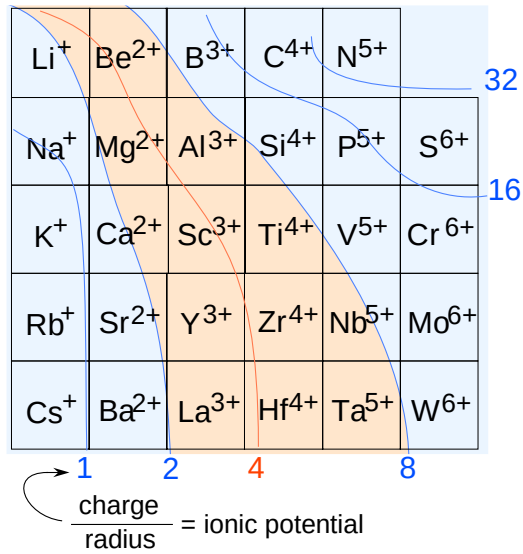


*Bowen's (1922) original formuation of the "reaction principal" included this middle branch for the spinels. Zircon is added here for the sake of completeness.





Contours of ionic potential:



Conceptual model of the behavior of oxides of hard (and intermediate) cations