



## Textures of aluminum-rich metamorphic minerals

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Some of the most interesting textures in metamorphic rocks involve Al-rich minerals, e.g., garnet porphyroblasts; 1, 2, or 3  $\text{Al}_2\text{SiO}_5$  polymorphs in a rock; and symplectite/coronas around garnet and kyanite. Because Al-rich minerals are commonly involved in equilibria that are temperature or pressure sensitive, textures involving these minerals may provide information about crystallization sequence, rates, and reaction history; interactions between metamorphism and deformation; and, therefore, pressure-temperature-time-deformation conditions and paths. Examples of textural features that may link metamorphic crystallization processes with driving forces and conditions include grain boundary configurations, crystal shapes, crystallographic orientations, and the development of shape and/or lattice preferred orientation. Three examples of textural observations involving Al-rich metamorphic minerals are: (1) multiple lattice domains with high-angle boundaries in morphologically single crystals of garnet, providing information about how porphyroblasts form; (2) varying degrees of shape and/or lattice-preferred orientation and polymorphic transformation in  $\text{Al}_2\text{SiO}_5$  polymorphs, including naturally deformed crystals and polymorphs experimentally deformed under shear and in torsion, providing information about the interaction of deformation and metamorphism at different P-T conditions; and (3) the mineralogy, modes, and 3-D textural features of symplectites formed by reaction of kyanite to Fe-Mg-Al-rich phases, providing information about P-T paths and rates. All of these textures involve Al-rich minerals that provide P-T information, and therefore are a critical link between conditions and mechanisms of texture formation and rates and paths of regional metamorphism.