SPECIALIZED GRANITIC SYSTEMS: A PHYSICO-CHEMICAL DESCRIPTION

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Specialized granites are associated with a wide range of ore deposits. The exact extremes of element enrichment in specialized granitic magmas are currently debated but it appears clear that minor element abundances of many components typically present in the trace element range of most granitic magmas are achieved. The enrichment of such elements in granitic melts influences the properties of the magma in two ways: 1) direct influence of the components on the melt properties through their partial molar properties as a consequence of their structural roles in the melt phase and 2) indirect influence of melt properties via the influence of these components on the phase equilibria of the magma. Many components of specialized granites lead to strong decreases in the temperature range of liquidus-solidus and as a result different physical and chemical melt properties can be expected. Additionally, a different thermal and mechanical relationship to the host rocks of igneous intrusion might be expected. The brittle-ductile transition will certainly be affected.

In order to understand the properties of magmas present during magmato-hydrothermal ore deposition, the influence of such enrichments on the physicochemical properties of granitic magmas have been experimentally investigated. The direct and indirect influences of minor components on melt viscosity, density, solubility of water and surface tension will be reviewed.