PEROVSKITES FROM THE MATA DA CORDA KAMAFUGITES, MG, BRAZIL

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The Mata da Corda kamafugites occur in the western part of the Minas Gerais State, overlying a non-volcanic sedimentary sequence. These rocks form the São Francisco Basin of Cretaceous age. The kamafugites are part of the Alto Paranaíba Igneous Province, which includes also intrusions of kimberlitic affinity, lamproitic rocks and carbonatites.

The kamafugites are constituted essentially by clinopyroxene, perovskite, and magnetite, and less abundant olivine, phlogopite, melilite pseudomorphs, and apatite. The felsic phases present are kalsilite and/or leucite pseudomorphs. These rocks may be classified as mafitites, leucitites, kalsilitites, and pyroxenites (Sgarbi and Valença, 1991).

Perovskite occurs as phenocrysts, microphenocrysts, and groundmass in all petrographic types and is always abundant (3 to 12%vol.). The largest grain size is about 0.6mm. Chemical analyses were performed in a Cameca SX50 electron microprobe at the University of Brasília, using 25 Kv, 200 nA, with a focused beam. The REE glass standards described by Drake and Weill (1972) were used.

Perovskite compositions are close to the perovskite end member with relatively low REE, Sr, and Na contents. FeO and SiO_2 contents are higher in groundmass grains than phenocrysts for all petrographic types. Nb_2O_5 contents are always lower than 1.0wt%. Na_2O and SrO contents of perovskites from leucitites are higher (0.6 - 1.0 and 0.8 - 1.3wt%, respectively) when compared with those from the mafitites (Na_2O = 0.14 - 0.72 and SrO = 0.15 - 0.63wt%). The leucitites are the most evolved members of the studied rocks. The increase in SrO with magmatic evolution is in agreement with the prediction by Mariano and Mitchell (1991) for pyroxenite perovskites from the Alto Paranaíba Province. These authors predicted an evolution trend towards the loparite end member ($SrTiO_3$). Perovskites from a cognate pyroxenite xenolith have intermediate Na_2O and SrO contents between the mafitites and leucitites.

The average REE content is about 3.0wt%. Ce_2O_3 varies from 0.73 to 2.47wt% and La_2O_3 from 0.41 to 1.02wt%. Surprisingly, the REE contents of perovskite phenocrysts from the mafitites are higher than REE contents of groundmass grains. There is one exception in which the relation is opposite. In this last case the olivine crystals present in the sample show reverse zoning (Sgarbi and Valença, 1994). This suggests that the variation in REE contents reflects variation in liquid composition. The REE content in the liquid is also controlled by apatite. It is possible that with the onset of apatite crystallization the liquid became depleted in REE.

When plotted in terms of atomic percentage in the Sr-(REE+Ca)-(Na+Nb) and Ca-Na-REE diagrams, the Mata da Corda perovskites cluster around the REE+Ca and Ca (perovskite end member) vertices, respectively. Considering the diagram's variables and compared to the data from Mitchell and Steele (1992) the Mata da Corda perovskites are unique, being different even from the Salitre I perovskites (occurring in fenites), which is also part of the Alto Paranaíba Province. In the SrO-Ce_2O_3 (wt%) diagram presented by Mitchell and Steele (1992) the Mata da Corda perovskites, however, plot in the composition field of perovskites from kimberlites and alnöites. The Mata da Corda perovskites overlap also some perovskite compositions from olivine lamproites from Ellendale (West Australia) and Praire Creek (Arkansas, USA).

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