

## Sodicgedrite in Mg-Al rocks from the Palghat-Cauvery Shear Zone System, southern India

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The Palghat-Cauvery Shear Zone System (PCSS) at the northern margin of the Madurai Granulite Block in southern India is regarded as the collisional boundary between the Archean terrane to the north and Neoproterozoic granulite blocks to the south. Previous petrological studies on Mg-Al rocks from the PCSS suggested that the zone underwent high-pressure (near eclogite-facies) metamorphism and subsequent ultrahigh-temperature events probably associated with the final suturing of the Gondwana assembly in the late Pan-African orogeny. Such Mg-Al rocks in the PCSS generally comprise garnet, sillimanite, corundum, sapphirine, spinel, staurolite and cordierite as well as gedrite. Although gedrite is a common mineral in amphibolite-facies rocks, they are also reported from several high- to ultrahigh-temperature granulite-facies terranes. Such high-grade gedrites are generally rich in Na<sub>2</sub>O (max=2.3 wt.%) compared with low-grade phases. This study reports the occurrence of extremely Na-rich gedrite (sodicgedrite; up to 2.8 wt.% Na<sub>2</sub>O) in Mg-Al rocks from Sevitturampatti (Namakkal District) in the PCSS and discusses its petrological implications.

Na contents of gedrite in the examined samples increase linearly with increasing Al contents. Gedrite coexisting with garnet and quartz shows the highest Na<sub>2</sub>O content as ~2.8 wt.%, while Al-rich gedrite (Al<sub>2</sub>O<sub>3</sub>= 23.1 wt.%) occurs together with garnet, quartz and cordierite. Although Ca-amphibole in high-grade rocks generally contains high fluorine, studied sodicgedrite is almost free from F (less than

0.1 wt.%). On the basis of Na/Al ratio, the examined gedrites are subdivided into three types. Type (i) gedrite is pale brownish and characterized by medium Na/Al ratio of 0.1-0.2. In contrast, type (ii) gedrite that occurs together with spinel and secondary chlorite has a high Na/Al ratio of 0.2. Its Mg/(Fe+Mg) ratio of 0.8 is the highest among the examined gedrites. Type (iii) pale brownish gedrite coexisting with garnet and sapphirine shows the lowest Na/Al ratio of 0.1. The type (iii) gedrite occasionally has a compositional zoning in terms of Na and Al; core of coarse-grained gedrite is rich in Al and Na (Al<sub>2</sub>O<sub>3</sub>= 21.4-21.7 wt.%, Na<sub>2</sub>O= 1.6-1.8 wt.%) compared with its rim (Al<sub>2</sub>O<sub>3</sub>= 18.9-19.3 wt.%, Na<sub>2</sub>O= 1.3 wt.%).

The stability of sodicgedrite in high-grade metamorphism has been examined on the basis of the MASH equilibrium reaction; Ged + Sil = Crd + Grt + H<sub>2</sub>O. The stability field of gedrite in the reaction increases about 150C at 10 kbar, if the activity of Na in the mineral is taken into account. The occurrence of sodicgedrite is therefore regarded to be an indicator of ultrahigh-temperature metamorphism.