

**EVIDENCE FOR PARTIAL MELTING IN METAPELITIC ROCKS FROM THE  
UHP TERRANE, NORTH-EAST GREENLAND ECLOGITE PROVINCE**

LANG, H.M.<sup>1</sup> & GILOTTI, J.A.<sup>2</sup>

<sup>1</sup>Department of Geology & Geography, West Virginia University, Morgantown, WV 26506, USA

<sup>2</sup>Department of Geoscience, University of Iowa, Iowa City, IA 52242, USA

e-mail: hlang@wvu.edu

Although pelitic rocks are rare in the North-East Greenland Eclogite Province, a few samples of pelitic paragneiss were collected near the location where Caledonian ultra-high pressure (UHP) metamorphic conditions have been documented in mafic eclogites (GILOTTI & RAVNA, 2002). The most interesting of these pelitic paragneisses contain large (up to 2 cm), inclusion-rich garnet porphyroblasts, minor kyanite and layers and lenses of leucocratic, anatectic melt. The garnets contain abundant quartz inclusions, some of which are polycrystalline and surrounded by radial fractures, suggesting that they were initially coesite. In addition, the garnets contain inclusions of Ti-rich, phengitic white mica, which is consistent with UHP metamorphic origin, and large complex inclusions with polycrystalline quartz, white mica, biotite and feldspar. The matrix surrounding the large garnets in the pelitic paragneiss contains variably recrystallized quartz ribbons, and layers and lenses of migmatitic leucosome. The leucosome contains abundant small garnets, minor kyanite, biotite, myrmekite, plagioclase and antiperthitic alkali feldspar, which is consistent with dehydration melting of phengitic white mica (INDARES & DUNNING, 2001). The fact that phengite pseudomorphs occur in the matrix in contact with leucosomes produced by partial melting indicates that melting began during or after UHP metamorphism that produced phengite.

Large, complex inclusions in some large garnets preserve evidence of partial melting entirely within garnet. In particular, one inclusion contains phengitic white mica, biotite, rutile, kyanite, quartz, Na-rich plagioclase and K-feldspar (antiperthite?). Textures suggest that two large phengitic white mica inclusions and adjacent quartz included in this garnet experienced dehydration melting by the reaction  $\text{Phengite} + \text{Plagioclase} + \text{Quartz} = \text{Kyanite} + \text{K-feldspar} + \text{Biotite} + \text{Liquid}$  (INDARES & DUNNING, 2001) to produce the large complex inclusion. Many other quartz inclusions in the large garnets have Plagioclase + K-feldspar rims against garnet. Partial melt textures and peak metamorphic minerals of the metapelites are better preserved inside the large, inclusion-rich garnets than in the matrix. Mineral textures and compositions from the inclusions will be important in reconstructing the peak and post-peak metamorphic and reaction history of UHP metapelites in the North-East Greenland Eclogite Province.

**References**

GILOTTI, J. A. & RAVNA, E. J. K. (2002): *Geology*, 30, 551-554.

INDARES, A. & DUNNING, G. (2001): *Journal of Petrology*, 42, 1547-1565.