

## **Rutile in the UHP eclogites from the Sulu terrane, China: an electron microprobe study**

RUCHENG WANG, SHUO WANG, JIANGSHENG QIU AND PEI NI

State key Laboratory for Mineral Deposits Research,  
Department of Earth Sciences, Nanjing University,  
Nanjing 210093, China (rcwang@nju.edu.cn)

Rutile is a common phase in eclogites, and has attracted considerable attention as a likely controller of Nb and Ta budgets in subduction zone processes (Zack et al. 2002). It has long been known that rutile can accommodate a wide range of highly charged trace elements up to the percent level, e.g., V, Cr, Fe, Nb.

The Sulu-Dabie ultrahigh-pressure (UHP) metamorphic belt in east China is one of the largest UHP terranes in the world. Chinese Continental Scientific Drilling (CCSD) provides us an opportunity to make a systematic study on accessory minerals in the Sulu UHP eclogites. The rocks contain garnet, omphacite, quartz (probably pseudomorph after coesite), phengite and rutile.

In the investigated rutile-bearing eclogites, anhedral, rounded rutile grains often occur as inclusions of major phases (mostly in garnet) or along their grain boundaries. It may also be observed in symplectitic zones, where rutile is partly or wholly replaced by sphene. Electron microprobe was used to measure the trace elements compositions of rutile with particular operating conditions (20kV, 100nA, 100-300s counting time).

Cr is one of important trace elements present in rutile. Its content appears in bimodal. Rutile in most of eclogites has <100ppm Cr, whereas rutile from the eclogite interlayered with peridotite contains as high as 3600ppm. Nb contents are lower than 700ppm, but are also divided into two subgroups. Rutile with high Cr contents has inversely weak Nb concentrations (<30ppm), however, other rutiles contain relatively higher Nb.

Zr concentrations in rutile oscillate about 120ppm. According to the recent Zr-in-rutile geothermometer (Zack et al. 2004), average temperatures of peak metamorphism of eclogites are obtained at about 620 to 650 °C.

This work is supported by CCSD Program – Ministry of Science and Technology of China (2003CB716507), and by NSF of China (40025209, 40221301).

## **Zircon U-Pb geochronology of migmatite in the Dabie orogen of China: Evidence for a genetic link between migmatitization and granitic magmatism**

Y.-B. WU, Y.-F. ZHENG AND S.-B. ZHANG

School of Earth and Space Sciences, University of Science and Technology of China, Hefei 230026, China  
(ybwu@mail.ustc.edu.cn)

It is intriguing whether migmatitization in orogenically thickened crust generated depleted granulite typical of the lower crust and granites typical of the upper crust. Extensive exposures of anatectic migmatite, granulite and associated granites in the Dabie Mountains, a continent-continent collision orogenic belt in east-central China, provide us a good opportunity to address this issue. A detailed zircon U-Pb dating was carried out for migmatite from North Dabie and the results are used to identify the timing of protolith formation and partial melting event, and to evaluate the relationship between migmatitization, granulite-facies metamorphism and granitic magmatism. Zircons recovered from leucosome and melanosome were in-situ dated by SHRIMP and/or LA-ICP-MS techniques based on CL imaging. Two groups of metamorphic zircon with distinct morphology and trace element characteristics are recognized, corresponding to U-Pb ages of 135 to 140 Ma and 120 to 130 Ma, respectively. Magmatic cores of zircon from different samples gave U-Pb ages of 700 to 800 Ma.

The first group of metamorphic ages suggests that the migmatitization took place prior to about 140 Ma. The second group of metamorphic ages is identical to that of voluminous granite emplacement at Early Cretaceous. The middle Neoproterozoic ages for the magmatic core are consistent not only with the protolith ages of most UHP metaigneous rocks in this orogen, but also with U-Pb ages of inherited zircons in the Early Cretaceous granites. The present results thus suggest a genetic link between the migmatitization and the coeval granitic magmatism. The middle Neoproterozoic ages obtained in the most samples indicate that the protolith of migmatite is the product of rift magmatism along the northern edge of the South China Block. The Early Cretaceous migmatitization is associated with partial melting of the thickened subducted Yangtze continental crust. If felsic melts would be separated away from the residues, the former may be further fractionated to result in the observed granites whereas the latter could correspond to the granulite-facies orthogneiss in the same regions.