Multiple anatexis in the North Dabie complex zone, central China: New constrains from leucosomes within the migmatites

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The North Dabie complex zone (NDZ), central China is a high-T (>850°C) ultrahigh-pressure metamorphic terrane [1-4]. It mainly consists of tonalitic and granitic orthogneisses with subordinate meta-peridotite, garnet-bearing amphibolite, granulite and eclogite. It underwent a complex process involved in multistage metamorphism [1,4,5] and multiple anatexis, characterzed by granulite-facies overprinting and a variety of migmaties with multiple episodes of leucosomes.

Four groups of leucosomes have been recognized: (1) strongly deformed leucosomes with peritectic garnets, low $(La/Yb)_N$ and Sr/Y ratios and strong negative Eu anomalies; (2) weekly-deformed amphibole-rich leucosomes with peritectic amphiboles, low $(La/Yb)_N$ and medium Sr/Y ratios and weak positive Eu anomalies; (3) weekly-deformed amphibole-bearing leucosomes with high $(La/Yb)_N$ and Sr/Y ratios and weak positive Eu anomalies; (4) coarse K-feldspar-rich leucosomes with the lowest total REE contents, highest Sr/Y ratios and strong positive Eu anomalies. Combined with zircon U-Pb dating, the leucosomes within the migmatites in the NDZ formed at 209 ± 2 Ma for the Group 1 and 143 ± 2 Ma – ~110 Ma for Groups 2–4, in response to decompression melting under granulite-facies conditions during exhumation and heating melting during post-orogenic collapse, respectively. In addition, Groups 2 and 3 suffered from 125–130 Ma thermal metamorphism, and Group Two and Group Four leucosomes were generated by water-fluxed and fluid-absent melting whereas Group One was produced by biotite dehydration melting. However, the Sr-Nd-Pb isotope compositions suggest that all the leucosomes have similar sources from the Triassic subducted lower-crustal rocks.

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