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新疆西南天山木扎尔特河一带低压泥质麻粒岩岩石学特征、独居石U-Th-Pb定年及其地质意义

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摘要:

古南天山洋闭合过程中,由于洋壳俯冲产生的岛弧岩浆作用加热大陆地壳,在新疆西南天山木扎尔特一带形成了一套低压高温泥质麻粒岩相变质岩石。本文用Theriak-Domino热力学软件对该套岩石中的堇青石榴夕线石黑云母片麻岩和含夕线石堇青石榴黑云母片麻岩进行了岩石学相平衡计算研究,得到它们峰期变质的温压条件分别是: $T=630\sim 674^{\circ}\text{C}$, $P=5.2\sim 5.5\text{kbar}$ 和 $T=645\sim 684^{\circ}\text{C}$, $P=5.4\sim 5.7\text{kbar}$ 。并采用独居石Th-U-Pb电子探针定年方法,对样品WQ006中的3颗独居石进行了原位年龄测定(38个分析点),得到2组等时线年龄,分别是 $376\pm 8\text{Ma}$ 和 $280\pm 8\text{Ma}$ (2σ)。结合独居石的岩相学特征,提出了新疆西南天山低压高温麻粒岩相峰期变质作用的时代为 $280\pm 8\text{Ma}$,而 $376\pm 8\text{Ma}$ (2σ)可能为原沉积岩的原岩/成岩年龄。表明西南天山洋壳开始俯冲发生在晚古生代,进一步证明了西南天山造山带俯冲碰撞发生在晚二叠纪之后的观点。

英文摘要:

During the closure of the South Tianshan Paleo-Ocean, a suite of low-pressure pelitic granulite-facies Crd-Grt-Sil-Bt gneiss was formed by the intrusion of arc magma into the landward continental margin of Muzhaerte River in South Tianshan, Xinjiang. Using the thermodynamic software of Theriak-Domino, we performed the NCKFMASH phase equilibria calculation on the Crd-Grt-Sil-Bt gneiss (WQ003) and the sillimanite-bearing Crd-Grt-Bt gneiss (WQ006), and gained that their peak metamorphic conditions are $T=630\sim 674^{\circ}\text{C}$, $P=5.2\sim 5.5\text{kbar}$ and $T=645\sim 684^{\circ}\text{C}$, $P=5.4\sim 5.7\text{kbar}$, respectively. Moreover, we carried out the geochronological research on three monazite grains in sample WQ006 with the technique of U-Th-Pb chemical monazite dating by electron microprobe and got two characteristic isochron ages, $376\pm 8\text{Ma}$ and $280\pm 8\text{Ma}$ (2σ). Based on the petrographic study of monazite, $280\pm 8\text{Ma}$ can be explained as the age of peak granulite-facies metamorphism, whereas $376\pm 8\text{Ma}$ (2σ) maybe represent the age of detrital or diagenesis, and we conclude that the subduction of South Tianshan oceanic crust began in Late Paleozoic and confirm the opinion that the subduction-collision of Southwest Tianshan orogen occurred after Late-Permian.

关键词: [西南天山](#) [独居石](#) [低压麻粒岩](#) [双变质带](#) [等时线年龄](#) [古南天山洋](#)

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