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吉林东部延边地区二长花岗岩年代学、岩石成因学及其构造意义研究

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摘要:

高岭岩体位于吉林省延边地区和龙市东侧, 大地构造位置上位于华北板块北缘东段, 岩性主要为似斑状二长花岗岩, 基质为中粒-中细结构。LA-ICP-MS锆石U-Pb测年结果显示, 样品YH04和N-5的加权平均年龄分别为 $172.25 \pm 0.97\text{Ma}$ 和 $170.9 \pm 0.68\text{Ma}$, 表明岩体侵位时代为中侏罗世。岩石地球化学特征上, 高岭岩体样品具有高硅(69.60%~74.30%)、富铝(13.90%~15.80%)、富钾(3.05%~4.50%)和低镁(0.22%~0.82%)及 $\text{Mg}^\#$ (26~37)的特点。样品富集轻稀土元素, 相对亏损重稀土元素(LREE/HREE=13~2.1), 具有微弱的负Eu到正Eu异常($\delta\text{Eu}=0.78\sim 2.14$), 其稀土元素配分模式图与埃达克岩稀土元素配分模式图类似。高岭岩体样品富大离子亲石元素Cs、Rb、Ba、K、Sr和高场强元素Th、U和Zr, 同时亏损高场强元素Nb、Ta以及P元素。同时样品具有较低的初始 $^{87}\text{Sr}/^{86}\text{Sr}$ 值(0.7039~0.7051)和负的 $\epsilon_{\text{Nd}}(t)$ 值(-0.6~-0.3), 且其 t_{DM1} 和 t_{DM2} 模式年龄分别为922~928Ma和984~1011Ma, 表明研究区新元古代存在地壳增生事件。Sr-Nd同位素特征及岩石地球化学特征表明高岭岩体母源岩浆来源于加厚下地壳基性岩石部分熔融且受到新元古代增生物质的影响。结合区域构造演化, 中侏罗世高岭岩体侵位构造环境可能受到环太平洋构造体系和华北板块与西伯利亚板块持续碰撞的叠加影响。

英文摘要:

Gaoling pluton is located to the east of Helong City in Yanbian area, Jilin Province. Tectonically, it is at the eastern segment of the northern margin of the NCC. It is mainly of porphyritic monzogranite with the matrix of medium to medium-fine texture and alkali feldspar phenocryst. Sample YH04 and N5 were selected for LA-ICP-MS zircon U-Pb dating. The analyses of zircons yield weighted mean $^{206}\text{Pb}/^{238}\text{U}$ ages of $172.25 \pm 0.97\text{Ma}$ and $170.9 \pm 0.68\text{Ma}$, respectively, suggesting they are formed in the Middle Jurassic. Petrogeochemically, Gaoling pluton is high in SiO_2 (69.60%~74.30%), Al_2O_3 (13.90%~15.80%) and K_2O (3.05%~4.50%), and low in MgO (0.22%~0.82%) and $\text{Mg}^\#$ (26~37). They are strongly enriched in light REE and depleted in heavy REE with weak negative to positive δEu (0.78~2.14), which is similar to adakites. Gaoling pluton is enriched in large ion lithophile elements (LILE) (e.g., Cs, Rb, Ba, Th, U, K, and Sr), and depleted in high field strength elements (HFSE) (e.g., Nb, Ta and P). These rocks have low initial $^{87}\text{Sr}/^{86}\text{Sr}$ (0.7039~0.7051) and negative $\epsilon_{\text{Nd}}(t)$ values (-0.6 ~ -0.3), with the t_{DM1} ranging from 922Ma to 928Ma and while t_{DM2} ranging from 984Ma to 1011Ma, suggesting the existence of Neoproterozoic crustal growth event. The geochemical data indicate that the Gaoling pluton magma was derived mainly from partial melting of mafic rocks in thickened lower crust which likely affected by Neoproterozoic accretion material. Combined with regional tectonic evolution, we suggest that the emplacement of Gaoling pluton was related to the subduction of the circum-Pacific tectonic system beneath the Eurasian continent and continually collision between North China and Siberia Plates.

关键词: [LA-ICP-MS锆石U-Pb测年](#) [岩石地球化学](#) [构造环境](#) [中侏罗世](#) [延边地区](#)

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