

tectonic sections in the proportion 1:2000 are mapped on the basis of the 1:50000 regional geological surveying. In addition, a great number of micro structural observations and fabric measurements are completed in the laboratory. The research shows that the evidence of the Neo-Archean fault is expressed by the high temperature ductile shear zone of high amphibolite facies granulite facies that is overprinted by the low temperature ductile shear zone of the greenschist in the shallow layers after the Lower Proterozoic crust was elevated in the extension system. After the Middle Proterozoic, this ductile shear zone is transformed into brittle fault, controlling deposition and magma formation in different periods.

Key words: high temperature ductile shear zone; low temperature ductile shear zone; Guyang County, Inner Mongolia.

东昆仑造山带东段晋宁期岩浆活动及其演化

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东昆仑造山带岩浆岩出露面积巨大, 构成规模宏大的东昆仑岩浆弧带。侵入岩以海西—印支期为主体, 少量加里东期、燕山期岩浆活动^[1~3]。在进行冬给措纳湖幅 1:25 万填图过程中, 在东昆仑造山带东段发现晋宁期侵入岩。晋宁期侵入岩分布于东昆仑造山带北侧的东昆北岩浆弧带内瓦了尕—杀雄一带, 出露面积约 30 km², 由两个侵入体组成, 岩石主要为奥长花岗岩、英云闪长岩。围岩为古元古代白沙河岩群, 并被海西—印支期花岗闪长岩超动侵入。古元古代白沙河岩群主要岩性有条带状斜长角闪岩、黑云斜长片麻岩、变粒岩、浅粒岩、条带状大理岩、云母石英片岩和云母片岩等, 变质条件总体为中角闪岩相, 局部达麻粒岩相。其构造变形以中深层次的流动褶皱和流动剪切为主。晋宁期侵入岩已强烈变质变形, 但仍具侵入体外貌。在野外露头上岩性均匀, 局部见其与围岩大理岩呈侵入接触关系或包裹暗色的基性包体。岩石普遍具片麻状构造, 由于强烈的变形、变质而使岩体与围岩间相互穿插, 总体上看, 围岩大多呈巨大的顶垂体和捕掳体产出于变质侵入体中, 局部可见侵入体与围岩间明显的侵入接触关系。岩石为灰白色, 中粒—中粗粒鳞片粒状变晶结构。矿

物成分主要为斜长石、石英、黑云母、白云母、钾长石, 少量黑云母已退变成绿泥石, 白云母因变形而显示扭折现象。此外, 尚有少量不透明金属矿物和锆石等副矿物。

晋宁期变质侵入岩地球化学成分中 FeO, MgO 质量分数比正常的花岗岩低。原岩为奥长花岗岩及英云闪长岩, 部分岩石由于后期变质作用的改造钾质较高。稀土元素表现出两种明显不同的特征。奥长花岗岩稀土总量略高, $w(\sum REE) = 180.7 \times 10^{-6}$, 轻稀土富集程度中等, $w(La)_n / w(Lu)_n$ 为 7.31, 轻—重稀土分馏不明显, 具明显的 Eu 负异常 ($\delta(Eu) = 0.56$), 稀土配分曲线为轻稀土富集, 中、重稀土平坦型, 该分配型式与太古代奥长花岗岩的稀土配分型式相同, 为地壳物质部分熔融的产物。英云闪长岩稀土总量略低, $w(\sum REE) = 97.56 \times 10^{-6} \sim 115.05 \times 10^{-6}$, $w(La)_n / w(Lu)_n$ 为 17.59 ~ 21.93, 轻—重稀土分馏十分明显, 具有明显的正 Eu 异常 ($\delta(Eu) = 1.15 \sim 1.46$), 稀土配分曲线为轻稀土富集型, 与太古宙英云闪长岩稀土配分曲线非常相近, 可能为玄武岩岩浆经结晶分异而形成。根据花岗岩稀土元素构造环境判别晋宁期侵入岩形成于火山弧和同碰撞构造环境, 与板块的俯冲或碰撞有关。

收稿日期: 1999-09-28

基金项目: 国土资源部冬给措纳湖幅 1:25 万区域地质调查与东昆仑造山带及非史密士地层区区域地质调查方法研究

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STRUCTURAL SLOPE BREAK ZONE: KEY CONCEPT FOR STRATIGRAPHIC SEQUENCE ANALYSIS AND PETROLEUM FORECASTING IN FAULT SUBSIDENCE BASINS

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Abstract: The structural slope break zone, resulting in the abrupt change of the depositional slope, is initiated by the long term activity of syndepositional structure. The researches into the Bohaiwan basin indicate that the structural slope break zone in the fault subsidence lacustrine basin constrained the change in the accommodation space of the basins, controlling the development of the depositional sequence and the distribution of the depositional system tracts and the sand bodies. The half graben basin may accommodate the following four kinds of structural slope break zones; uplift gentle slope margins, gentle slope depression margins, steep slope depression margins, and uplift steep slope margins. Furthermore, several syndepositional structural (fault) slope break patterns are identified such as “comb like structure” and “broom like structure”. These structures controlled the distribution patterns of the specific depositional systems tracts and the sand bodies in the basin. The structural slope break zone is favorable for the formation of petroleum accumulation. The structural slope break zone at the depression margin such as the “comb like structure” has proved important for the prediction and exploration of the deep seated subtle traps in the basin.

Key words: structural slope break zone; sand body prediction; fault basin.

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晋宁期奥长花岗岩锆石 Pb—Pb 年龄为(913±4)~(1011±4) Ma, U—Pb 同位素一致线年龄为(703±15) Ma, 表明该期侵入岩的形成年龄应大于 703 Ma, 在 1 000 Ma 左右, 为新元古代早—中期的产物. 通过白云母⁴⁰Ar/³⁹Ar 同位素年龄测定表明: 该期侵入岩在加里东期晚期遭受了强烈的变质变形的改造, 产生变质并形成片麻理, 变质时间为(386.8±0.8) Ma~(389.44±3.70) Ma.

东昆仑造山带为一多期复合造山带, 大面积出露海西—印支期侵入岩. 东昆仑晋宁期岩浆活动及

其后期遭受的加里东期变质作用的确定, 无疑为研究东昆仑晋宁及加里东期造山带形成及演化提供了重要的依据, 并对研究青藏高原的早期演化有重要意义.

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