

Located in eastern Inner Mongolia, the Dajing Cu-Ag-Sn polymetallic deposit is a large-scale deposit. The ore bodies occur in Permian Linxi Formation as vein-like, and are controlled by the NW or NWW trending faults. The studies on geochronology and geochemistry of the main intrusive and volcanic rocks occurring in and around the Dajing Cu-Ag-Sn polymetallic ore district were conducted in this paper. In order to constrain the emplacement ages of the intrusive rocks and the eruption ages of the volcanic rocks, the zircons of ten samples from the intrusive and volcanic rocks were dated by using the LA-MC-ICP-MS method. Two reliable weighted mean  $^{206}\text{Pb}/^{238}\text{U}$  ages of  $170.7\pm 1.4\text{Ma}$  (MSWD=1.9) and  $170.7\pm 1.1\text{Ma}$  (MSWD=1.3) were obtained from the altered felsite dyke close to the No.1 ore-vein in the Dajing ore district. The zircons from biotite-monzonitic granite in Maanzi, porphyritic-like biotite-monzonitic granite in Dasiduan village and andesite porphyry near Tangjiayingzi yield three weighted mean  $^{206}\text{Pb}/^{238}\text{U}$  ages of  $279.7\pm 1.3\text{Ma}$  (MSWD=0.74),  $252.0\pm 1.8\text{Ma}$  (MSWD=1.6) and  $242.8\pm 1.7\text{Ma}$  (MSWD=1.7), respectively. The volcanic rocks of rhyolitic crystal ignimbrite, rhyolitic breccia lava and crystal tuff from south Daba have the zircon U-Pb ages of  $143.5\pm 0.7\text{Ma}$  (MSWD=0.38),  $144.3\pm 0.7\text{Ma}$  (MSWD=1.2) and  $145.3\pm 1.0\text{Ma}$  (MSWD=2.5), respectively. The zircons from quartz porphyry dyke and andesite porphyry in south Xiaochengzi village give two U-Pb ages of  $146.1\pm 0.9\text{Ma}$  (MSWD=1.7) and  $133.2\pm 0.7\text{Ma}$  (MSWD=0.96), respectively. It indicates that there were four times of magmatic activities taking place in and around the Dajing Cu-Ag-Sn polymetallic ore district, i.e. Late Hercynian, Early Indosinian, Early Yanshanian and Middle Yanshanian, respectively. The geochemical analyses show that the all the intrusive and volcanic rocks are characterized by the high  $\text{SiO}_2$ , enriched alkali, meta-/per-aluminum and calc-alkaline, and are all plotted in the "high K calc-alkaline series" in the diagram of  $\text{SiO}_2$  vs.  $\text{K}_2\text{O}$ . All the samples in this study have the features of LREE differentiation, and are enriched in LILE elements, characterized by relatively depleted Ba, Nb, Sr, P and Ti, and enriched Rb, Th, K, Ce, Nd, Hf, Sm, Y and Yb. Combined with the dating results of the intrusive and volcanic rocks in this paper, the biotite-monzonitic granite in Maanzi and porphyritic-like biotite-monzonitic granite in Dasiduan village were formed under collisional setting possibly related to the closure of the ancient Asian ocean. The Early Yanshanian magmatic activity was not developed in the study area, and its tectonic setting is not clear yet. It may be related to the consumption of the Okhotsk Ocean between Siberian Plate and Mongolia-North China Plate and post collision. The large-scale Middle Yanshanian magmatic intrusion and eruption may be caused by the lithosphere thinning leading to the regional extension. Based on the studies on the intrusive and eruptive rocks occurring in or around the Dajing ore district, combined with ore deposit geology and the results of former studies, it is suggested that the ore-forming of the Dajing Cu-Ag-Sn polymetallic deposit was related to the Late Jurassic-Early Cretaceous (146~133Ma) magmatic activity, and was the product of the magmatism under the regional extension setting."/>

# 岩石学报

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江思宏,梁清玲,刘翼飞,刘妍. 2012. 内蒙古大井矿区及外围岩浆岩锆石U-Pb年龄及其对成矿时间的约束. 岩石学报, 28(2): 495-513

## 内蒙古大井矿区及外围岩浆岩锆石U-Pb年龄及其对成矿时间的约束

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**基金项目:** 本文受国家自然科学基金重点项目(41030421)、全国危机矿山项目(20089948)和地质大调查项目(1212010911029)联合资助。

### 摘要:

大井是内蒙古东部地区的一处大型铜银锡多金属矿床,矿体呈脉状产出在二叠系林西组地层中,受NW或NWW向断裂控制。本文对大井矿区及其外围主要侵入岩体和火山岩开展了年代学和地球化学研究。LA-MC-ICP-MS锆石测年结果表明,大井矿区内靠近1号矿脉产出的2件霏细岩脉样品的锆石年龄分别为 $170.7\pm 1.4\text{Ma}$ (MSWD=1.9)和 $170.7\pm 1.1\text{Ma}$ (MSWD=1.3);矿区外围马鞍子黑云母二长花岗岩体的锆石年龄为 $279.7\pm 1.3\text{Ma}$ (MSWD=0.74);唐家营子附近安山玢岩脉的锆石年龄为 $252.0\pm 1.8\text{Ma}$ (MSWD=1.6);大四段村似斑状黑云母二长花岗岩体的锆石年龄为 $242.8\pm 1.7\text{Ma}$ (MSWD=1.7);采自大坝南部的流纹质晶屑熔结凝灰岩、流纹质火山角砾熔岩和晶屑凝灰岩的锆石年龄分别为 $143.5\pm 0.7\text{Ma}$ (MSWD=0.38), $144.3\pm 0.7\text{Ma}$ (MSWD=1.2)和 $145.3\pm 1.0\text{Ma}$ (MSWD=2.5);小城子村南部石英斑岩脉的锆石年龄为 $146.1\pm 0.9\text{Ma}$ (MSWD=1.7),安山玢岩脉的锆石年龄 $133.2\pm 0.7\text{Ma}$ (MSWD=0.96)。反映本区至少存在四期岩浆活动,分别是海西晚期、印支早期、燕山早期和燕山中期。岩石地球化学分析结果表明,大井矿区及外围主要侵入岩(黑云母二长花岗岩、似斑状黑云母二长花岗岩、霏细岩、安山玢岩和石英斑岩)均为富 $\text{SiO}_2$ 、富碱、准铝的钙碱性岩石,在 $\text{SiO}_2$ - $\text{K}_2\text{O}$ 图解上均落入"高钾钙碱系列"区。所有的岩石样品具有轻稀土分异明显、富集大离子亲石元素(LILE)的特征,其中Ba、Nb、Sr、P、Ti相对亏损,而Rb、Th、K、Ce、Nd、Hf、Sm、Y和Yb相对富集。侵入岩和火山岩的年代学与岩石地球化学特征表明,马鞍子黑云母二长花岗岩和大四段村似斑状黑云母二长花岗岩的侵入可能与古亚洲洋的碰撞闭合有关,形成于挤压的构造环境;燕山早期侵入岩在本区并不发育,其形成环境还有待进一步查明,可能与西伯利亚板块和蒙古-华北板块之间的鄂霍茨克洋消亡及后碰撞造山有关;而燕山晚期大规模的侵入-火山喷发活动可能是由岩石圈减薄,区域大规模伸展所引起。根据本文对矿区内及外围侵入岩与火山岩的年代学研究,结合矿区地质和前人研究成果,认为大井铜银锡矿床的成矿主要与晚侏罗世-早白垩世岩浆活动(146~133Ma)有关,是区域伸展构造背景下岩浆活动的产物。

关键词: [锆石LA-MC-ICP-MS测年](#) [岩浆岩](#) [银铜锡多金属矿床](#) [大井](#) [内蒙古](#)

投稿时间: 2011/10/8 最后修改时间: 2012/1/10

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