

ZHANG Dexian, LU Anhuai, MA Weidong, ZUO Hongyan and CUI Yui, 2014. Trace Element and REE Characteristics of Quartz From Dayingezhuang Gold Deposit, Jiaodong Peninsular. *Acta Geologica Sinica* (English Edition), 88(supp. 2): 837-838.

Trace Element and REE Characteristics of Quartz From Dayingezhuang Gold Deposit, Jiaodong Peninsular

ZHANG Dexian, LU Anhuai, MA Weidong, ZUO Hongyan and CUI Yui

School of Geosciences and Info-physics of Central South University, Changsha, Hunan, China, 410083

1 Introduction

Quartz is one of the important rock-forming minerals in earth crust, and are very common in almost all kinds of hydrothermal deposit. The trace element and REE content varies in different mineral deposits, which can reveal the nature of ore-forming fluids and to some extent genesis of the deposits.

The Dayingezhuang Gold deposit located in the west part of Jiaodong peninsula, is a typical orogenic gold deposits. We attempt to focus on the trace element and REE geochemistry of quartz from Dayingezhuang gold deposit to study the metallogenic con-

around 6 J/cm², the analysis time for each spot was 65s, comprising a 30s measurement of background (laser off) and a 35s analytical signal. Data reduction was carried out using Glitter according to standard methods (longerich et al., 1996) and using NIST SRM612 and 614 silicate glass standard for concentration calculations assuming stoichiometric quartz. Signals were manually screened for heterogeneities such as mineral or fluid inclusions or other contamination where mineral inclusions were identified, data were discarded.

3.2 Result

We analyzed for the following elements typical detection limits for a 45(or 60) mm spot are shown in

2 Geological Background

Dayingezhuang gold deposit are hosted in the Archaeozoicmetamorphic rocks composed by amphibolite, granulite, schist and gneisswith a 2500 Ma (zircon U-Pb dating) age.The deposit are intimately associated with the linglonggranitewith a 156-160 SHRIMP zircon U-Pb dating) age, but Au mineralization occurredaround 120-130 Ma which suggested it is related to Guojialing granite possibly concealed in the deep part. Two major orebody I and II is strictly controlled by structure and distributed along the regional fault.

3 Trace element and REE Geochemistry

3.1 Analyses

Two samples from orebody I and four samples from orebody II of Dayingezhuang gold deposit.Thirty-two analyses were conducted on a Geolas 193 nm excimer laser ablation system coupled to a Varian 820-MS series quadrupole ICP-MS at the Advanced Analytical Center (AAC) at James Cook University. Spot size ranged from 44 to 120 mm. The laser repletion rate was maintained

Table 1 The detected limits of element in quartz in this study

Element	Li	Na	Al	Si	K
D.L.	0.32	3348	384	10925	5.05
Element	Ca	Ti	Fe	Cu	Zn
D.L.	7.29	8.00	4.14	0.15	0.38
Element	Ga	Ge	Rb	Sr	Zr
D.L.	0.09	0.08	1.19	2.68	2.30
Element	La	Ce	Pr	Nd	Sm
D.L.	0.33	0.65	0.08	0.17	0.03
Element	Eu	Gd	Tb	Dy	Ho
D.L.	0.02	0.03	0.01	0.03	0.01
Element	Er	Tm	Yb	Lu	Pb
D.L.	0.03	0.01	0.03	0.01	0.44

Table1.

Quartz from granite and veins at Dayingezhuang gold deposit commonly contains detectable quantities of numerous element: Li (6-10 ppm, average ppm), Na (105037-144697 ppm, average 134730 ppm), Al (8730-25120 ppm, average 12781 ppm), K(5512-28291 ppm, average 8228 ppm), Ca(55299-74095 ppm, average 69444 ppm), Ti(133-175 ppm, average 9 ppm), Fe(922-1238 ppm, average 1155 ppm), Cu(3-5 ppm, average 4 ppm), Zn(7-11 ppm, average 9 ppm), Ga(1-5 ppm, average 2

* Corresponding author. E-mail: dxzhang303@gmail.com

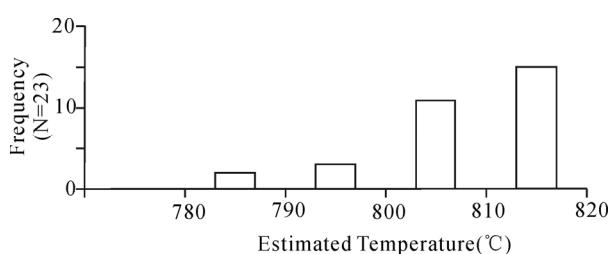


Fig. 1 Histogram of Frequency Vs Estimated temperature of Dayingezhuang gold deposit, Jiaodong Peninsular

ppm), Ge(1-2 ppm, average 1 ppm), Rb(21-75 ppm, average 30 ppm), Sr(34-158 ppm, average 50 ppm), Zr (43-57 ppm, average 52 ppm), REE and Pb(6-10 ppm, average 9 ppm).

Titanium in quartz thermometer have prompted wide applications to petrological problems. The estimated temperature of quartz from Dayingezhuang gold deposit of Jiaodong peninsular ranges from 783°C to 819°C, and most of them fall into around 820°C. REE content in quartz from Dayingezhuang gold deposit are extremely abnormal. The total REE ranges from 21.45 ppm to 33.87 ppm, and LREE/HREE ranges from 6.14 to 8.84 ppm, and $\text{La}_{\text{N}}/\text{Yb}_{\text{N}}$ ranges from 5.55 to 9.48. δ_{Eu} and δ_{Ce} range from 0.49, 0.37 to 1.74, 0.83 respectively. Total REE, δ_{Eu} and δ_{Ce} decrease down to the depth, while LREE/HREE and $\text{La}_{\text{N}}/\text{Yb}_{\text{N}}$ increase. δ_{Eu} decrease down to the depth from 1.74 to 0.49 (Fig.2).

4 Discussion

Jiaodongpeninsular is one of the most important gold productions in China, where Au mineralization styles can be categorized briefly into three types: quartz vein type, altered rocks type and fracture on the rim of basin type. Quartz is the common minerals and intimately associated with Au mineralization in most of the Au deposit in Jiaodong peninsular. Estimated temperature using titanium thermometers is above 800°C, which is possibly the forming temperature of granite. According to the field survey and previous researchers study, the ore-forming fluids may come from north east of the Dayingezhuang gold deposit, however, above mentioned REE parameters variations indicated the ore-forming fluids may comes from uplift depth, which is also proved by most of the Au deposit in north China craton is related to Mesozoic crust thinning events.

Reference

- Jackson SE, Longrich HP, Dunning GR, Freyer BJ (1992) The application of laser-ablation microprobe; inductively coupled plasma-mass spectrometry (LAM-ICP-MS) to in situ traceelement determinations in minerals. Can Mineral 30:1049-1064.
 Longrich HP, Jackson SE, Gunther D (1996) Inter-laboratory note. Laser ablation inductively coupled plasma mass spectrometric transient signal data acquisition and analyte concentration calculation. J Anal Atom Spectrom 11:899-904.

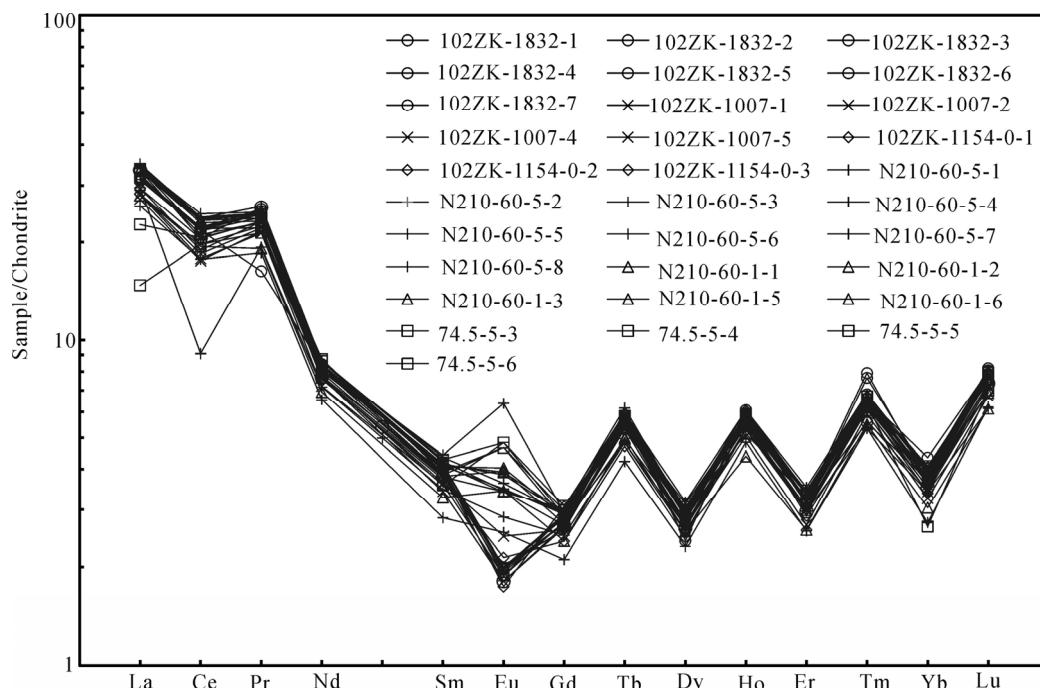


Fig. 2 All samples REE patterns of quartz