

**Geology, geochemistry,  
geochronology and metallogenic  
mechanism of the giant Yushishan  
Nb-Ta deposit in Eastern Altun,  
Gansu Province, NW China**

WEI CHEN<sup>1</sup>, XIAO-FENG CAO<sup>1\*</sup>, TONG-GUO  
LI<sup>2</sup>, YI-BU WU<sup>2</sup>, XIN-BIAO LÜ<sup>1</sup>

<sup>1</sup> State Key Laboratory of Geological Processes and Mineral Resources, Faculty of Earth Resources, National Demonstration Center for Experimental Mineral Exploration Education, China University of Geosciences, Wuhan 430074, China. Email: weichen@cug.edu.cn, Cao079@qq.com

<sup>2</sup> Gansu Geological Survey, Lanzhou 73000, China. Email: 603407229@qq.com

The giant Yushishan Nb-Ta deposit is located in Eastern Altun, Gansu Province. The results of the prospecting trenches and drillings show that the orebodies are mainly hosted in leptynites. The orebodies are distributed in layers along the east-west direction and are 320-1500 m long, 100-400 m width. Three ore types, namely; disseminated, banded and veined structure ore, are recognized. The deposit contains  $20 \times 10^4$  t Nb<sub>2</sub>O<sub>5</sub>, with (Nb, Ta)<sub>2</sub>O<sub>5</sub> mean grades of 0.061% and highest grades of 0.16%, respectively.

Geochemical characteristics indicate that the primary rock of the hosted leptynite is medium-acid magmatic rocks. There is more or less a small intrusive K-feldspar granite veins around the orebodies and a number of ore minerals are hosted in those granite veins. LA-ICP-MS zircon U-Pb dating provided weighted mean <sup>206</sup>Pb/<sup>238</sup>U ages of 503±2.6 Ma for the K-feldspar granite and four peaks of weighted mean <sup>206</sup>Pb/<sup>238</sup>U ages of 812 Ma, 765 Ma, 540 Ma and 500 Ma for the leptynite, respectively. Among those ages, 812 Ma represents the crystallization age of the magma and other ages represent later stages of metamorphic or hydrothermal events. The scanning electron microscope analysis of niobite and tantalite on polished sections show the obvious zoning patterns, indicating the metallogenic period is not only once. Detailed study on the geology, petrology, geochemistry, geochronology of the hosted leptynite and ore minerals of the Yushishan Nb-Ta deposit show that the first stage mineralization could be related to the highly fractionated magmatic rocks and the second stage mineralization could be related to the highly fractionated magmatic hydrothermal fluid in the later period.