

## HELIUM AND ARGON ISOTOPES OF SEVERAL METAL DEPOSITS IN CHINA

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Since the end of the 1980's, great progress has been made in the study of He and Ar isotopes in crustal fluids. Such progress is reflected mainly by the expansion of research scope from modern crustal fluids to ore-forming paleo-fluids trapped as fluid inclusions in geological history. However, up to now, only a few deposits and mineral species have been documented in the world. In this paper the vacuum crushing method to extract noble gases and the MAP215 noble gas mass spectrometer are employed to determine the He and Ar isotopic composition of fluid inclusions in minerals, which were formed during ore deposition, from the Jinding Pb-Zn deposit, the Machangqing Cu deposit and the Bayun OBO REE-Nb-Fe deposit as well as from the three Au deposits in the Ailaoshan gold belt. The following conclusions have been drawn. 1. Accompanied with the diffusion-loss of He from fluid inclusions, no obvious isotope fractionation occurred between the lost phase and the residual phase. In case that 90% of the element He is lost owing to diffusion from the fluid inclusions, the  $^3\text{He}/^4\text{He}$  ratio in residual He will decrease by 5% relative to the initial  $^3\text{He}/^4\text{He}$  ratio. 2. The ore-forming fluid responsible for the Machangqing Cu deposit, the Bayun Obo REE-Nb-Fe deposit and the three gold deposits hosted in the Ailaoshan gold belt is a mixture of crust-mantle end-member fluids. But the ore-forming fluid for the Jinding Pb-Zn deposit is a kind of ground hydrothermal solution, which was saturated with air of meteoric origin.