Laser ablation analysis of metal grains in carbonaceous chondrites

SAMANTHA J. HAMMOND[1], NICK W. ROGERS[2] AND PHIL A. BLAND[1]

[1]Department of Earth Science and Engineering, Impacts and Astromaterials Research Centre (IARC), Imperial College London, South Kensington Campus, London, SW7 2AZ, UK (s.hammond@imperial.ac.uk)

[2]Department of Earth and Environmental Science, The Open University, Walton Hall, Milton Keynes, MK7 6AA, UK

Carbonaceous chondrites are believed to be amongst the most primitive of materials from the solar system, and thus contain information on solar system formation processes. Whilst many studies have focussed on the silicate components which make up carbonaceous chondrites, few studies have investigated the metal grains within these samples.

Here, we present trace element data for 16 siderophile elements from metal grains within meteorites, which span a range of condensation temperatures (from 1821K to 883K (50% T_c) [1], using laser ablation inductively coupled mass-spectrometry (LA-ICP-MS). This work was carried out the Open University using an Agilent 7500s ICP-MS coupled with a New Wave 213 Nd:Yag deep UV (213 nm) laser system. Data manipulations are carried out using the GLITTER software package. Data are normalised to the NIST steel (SRM 1262b), Hoba [2] and Filomena [3].

Preliminary results, from the CR chondrite Renazzo, show that analyses from the same metal grain are homogeneous (as indicated from electron microprobe data from the same areas). All samples show a depletion in the most volatile elements (Ga and Ge), relative to CI chondrite, but show varying degrees of refractory element enrichment between grains. One grain shows refractory element enrichment (~6 times CI chondrite), similar to patterns observed in metal chondrule fragments by [4]. Other grains however, have CI like abundances for the most refractory elements (Re–Rh, 1821K–1392K), and have elevated abundances of the moderately refractory elements (~6 times CI for Ni–Au, 1353K–1060K).

The data suggest the possibility of two episodes of metal condensation, the first at high temperature (> 1392 K) that depletes the original nebula in the most refractory siderophile elements, and the second at <1392 K sampling the refractory-depleted material.

[1] Lodders (2003) *The Astrophysical Journal* **591,** 1220-1247 [2] Campbell & Humayun (2005) *GCA* **69**, 4733-4744 [3] Wasson *et al.* (1989) *GCA* **53**, 735-744 [4] Kong & Palme (1999) *GCA* **63**, 3673-3682.

Major deposit types and origin of Yimen-type copper deposits, Centre Yunnan, China

RUN-SHENG HAN[1], HAI-JUN ZOU[1] AND CONG-QIANG LIU[2]

[1]Kunming University of Science and Technology, Southwest Institute of Geological Survey, Geological Survey Center for Non-ferrous Mineral Resources, Kunming 650093, P.R.China (hrs661@yahoo.com.cn)

[2]Institute of Geochemistry, Chinese Academy of Sciences, Guiyang 550002, P. R. China

The Yimen copper deposit is an important one of copper deposits in China, located in the Yimen fault depression basin in the Proterozoic Kunyang rift at the margin of the Yangtze continent. There are two major deposit types in the ore-field: one is the volcano-hydrothermal sedimentation—reworking type (the Shishan-type), while the other is the volcano-hydrothermal sedimentation-strong reworking—magmatic superimposition type (the Fengshan-type).

On the basis of the metallogenic setting of the Yimen ore-field and the geological characteristics of the Yimen copper deposit, which is closely associated with volcano-hydrothermal sedimentation, tectonic transformation, magmatic superimposition, underground hot water reworking and metallogenesis. The ore-forming materials are of diverse sources, and are complex in origin. The homogenization temperatures and salinities of mineral fluid inclusions fall mainly within the two ranges: 110~200°C and 220~320°C; 4 wt%~10 wt% and 12 wt%~20.5 wt%. The $\delta^{34}S$ values of minerals (chalcopyrite, pyrite, bornite and bismuthinite) vary within the range of -7.2‰~-20.0‰. The metallogenic model of Yimen-type deposit is the 'rift metallogenic setting→volcano-hydrothermal sedimentation→tectonic transformation-enrichment→deep-source magmatic superimposition→underground hot water reworking'. The ore-forming system is of VMS-Tectonic Ore-forming processes.

Granted jointly by the fund for Supporting Project for State Science and Technology (2006BAB01B09)、NCET in State University (NCET-04-917) and the Major Discipline for KUST (2008).*Granted by the fund for NCET in State University (NCET-04-917) and the Major Discipline for KUST (2008)