6.1.P10

Pb isotopes established as tracers of provenance for tektites

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Pb isotopes have previously been used to establish the terrestrial origin of tektites [1,2], but have since rarely been measured on tektites.

Given the advances in analytical capabilities in measuring Pb isotopes since then, and particularly the possibility to measure Pb isotopic ratios *in situ* by LA-MC-ICPMS, we have conducted measurements on Austral-asian tektites (0.78 Ma), Moldavites (14.5 Ma) and Ivory Coast (1.07 Ma) tektites. The laser measurements were conducted on 200-400 um long tracks with a beam width of 100 um.

The measurements reveal very uniform concentrations and isotopic compositions of Pb in all samples. The ana-lytical precision for ^{206}Pb-^{207}Pb-^{208}Pb ratios are typically 0.01% and always better than 0.2% (2s) for Australasian tektites and Moldavites because of their high Pb concen-trations. The Ivory Coast tektites have much lower Pb abundances and, as a result, the isotopic precision range from 0.1 to 0.2 % (2s).

Pb isotopic results of tektites from the different strewn-fields plot in small and clearly separated fields in all Pb-isotopic ratio diagrams, and only the different Austral-asian tektites display a small linear trend, where Indo-chinites are the least radiogenic and Australites from the Nullabora Plains in Australia are the most radiogenic.

The more elongated field for Australasian tektites in Pb isotopes diagram corresponds to the wider range found in Sr isotopes in Australasian tektites [3,4,5] when compared to tektites from other strewnfields.

Pb isotopic measurements by LA-MC-ICPMS can now be used to rapidly assign unknown tektites and micro-tektites to their appropriate strewnfields. At the same time it can yield valuable information as to the provenance of the impact crater target material, and can assist in locating the elusive Australasian impact crater.

References

[1] Tilton G.R. (1958) *GCA* **14,** 323-330.
[2] Wampler J.M. *et al*., (1969) *GCA* **33,** 1045.
[3] Schnetzler C. & Pinson W.H; (1964) *GCA* **28,** 953-969. [4] Shaw H. and Wasserburg G.J. (1982) *EPSL* **60,** 155-177.
[5] Stecher O. *et al*.,(1989) *Meteoritics* **24,** 89-98**.**

6.1.P11

Copper- and gold-enriched ductile shear zones inside massive sulphide orebodies at Hongtoushan, NE China

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The Hongtoushan submarine exhalative massive sulphide deposit occurs in the Hunbei Archean (>30 Ma) greenstone belt in the NE sector of the North China craton. This deposit underwent metamorphism to upper amphibolite phases and polyphase deformation in the period of 2.8 – 2.5 Ma. Ore minerals are dominated, in order of abundance, by pyrite, pyrrhotite, sphalerite, chalcopyrite and electrum with gangues of quartz, plagioclase, garnet, amphibole and mica. The deposit has proven reserves of 0.36 Mt Cu, 0.47 Mt Zn and 5 t Au.

At least 30 ductile shear zones have been found inside the main massvie sulphide orebodies. These zones are 2 - 30 m in length, 0.1 - 1.5 m in width and 2 - 30 m in depth extension. Most of them run parallel or sub-parallel to the strike of the massive sulphide ore layers. Pyrite in the ore mylonites are cataclastically deformed and typified by porphyroclasts, while pyrrhotite, chalcopyrite, sphalerite show plastical deformation and subsequent recrystallization. Hydrothermal alterations are extensively developed and are characterized by epidotization, chloritization, silicification, albitization and carbonate alteration. Remobilized pyrite, chalcopyrie and electrum are seen filling cracks of pyrite porphyroclasts and lithoclasts.

Atomic absorption spectrometry analyses on six samples of massvie sulphide ores give metal contents (all in ppm) averaging 20800 Cu, 0.35 Au and 51 Ag, whereas six samples of ore mylonite yield average contents of 117300 Cu, 3.98 Au and 262 Ag, indicating that copper, gold and silver have been highly enriched in the ore mylonite.

Local distribution of the ductile shear zones in the massive sulphide orebodies and smaller grain sizes of recrystallized minerals than those in the massive ores imply that these shear zones were formed during diaphthorosis. Presence of extensive hydrous retrograde alterations in accompany with fluid-precipitation textures of sulphide minerals suggest that these zones have been overprinted by late-stage Cu- and Au-rich hydrothermal fluids. Lead isotope determinations indicate that the overprinting metals came from both the massive sulphide ores and the surrounding wallrocks.

This research was supported by China Natural Science Foundation (Grant Nos. 40172034, 50234051, 40221301 and 40372092).