Geological characteristics of the Hukeng tungsten deposit, Jiangxi Province, South China

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Hukeng tungsten deposit, located in Wugongshan metallogenic belt in central part of Jiangxi Province, South China, is one large scale quartz vein type wolframite deposit, which is in the south margin of Hukeng granite intrusion, covering the area of 6 km^2.

The strata exposed in the Hukeng ore district belong to the Sinian Laohutang formation and Likeng formation, and are composed of slightly metamorphic sericite phyllite, phyllitic siltstone and phyllitic sandstone. Two groups of faults are well developed in the Hukeng ore district, NE and NW faults separately, which are all composed of silicated breccia and mylonite and control the formation of the Hukeng tungsten deposit. There developed the Hukeng muscovite granite stock ($\gamma^{52\ (2)c}$) with age of 151.6±2.6 [1], where developed the wolframite-bearing quartz veins. The muscovite granites are with high content of garnet, developing silicification and greisenization generally and associated with W, Zn Bi and S mineralization. Wall rock alteration in the Hukeng deposit includes silicification, potassic feldsparization, fluoritization and hornfelsic alteration.

In this deposit, more than 310 ore veins with WO_3 grades from 0.1% to 2.5% have been recognized. These ore veins distribute in Xinsheng'ao sector, Hukeng sector and Xijialong sector. Ore types are mainly wolframite quartz ores, wolframite-fluorite quartz ores and wolframite-sulfide quartz ores. Ore minerals in this deposit are mainly wolframite and pyrite, secondly sphalerite and chalcopyrite, with minor amounts of molybdenite, chalcocite, cubanite, bismuthinite and native bismuth. The ore textures mainly include idiomorphic texture, hypautomorphic texture and poikilitic texture, and the ore structures include massive structure, banding structure and compound structure of massive and banding. Based on cross-cutting relationships of the ore veins, mineral assemblages, paragenetic sequence and ore fabrics, the ore-forming process can be divided into three mineralization stages: quartz-wolframite stage, quartz-fluorite-wolframite stage and quartz-pyrite-sphalerite-wolframite stage.

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[1] Liu *et al*. (2008) *Acta Petrologica Sinica* **24**(08), 1813–1822.

Experimental test of the CO self-shielding model for the early Solar System's oxygen isotope evolution

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We designed a laboratory experiment to test the carbon monoxide self-shielding (COSS) model advanced to explain the oxygen isotope distribution in the early Solar System materials [1-3]. Our unique 'windowless' vacuum ultra-violet (VUV) ultra high resolution laser photodissociation and photoionization mass spectrometry is designed to mimic the solar nebular photochemistry environment and experimentally verify if the CO photodissociation at VUV wavelengths (90-110 nm) would produce the expected mass independent oxygen isotope fractionation as predicted in the recently revived self-shelding model [1-3]. This model has been invoked to explain the peculiar oxygen isotope distribution observed in early solar system materials and has a specific prediction for the Sun's oxygen isotope composition [4], a top science priority of NASA's GENESIS mission.

However, the first experimental test of COSS model by [5] using the Advanced Light Source (ALS) at Lawrence Berkeley National Laboratory (LBNL), poses a serious question on the COSS model, although the validity of [5] were immediately challenged by [6-8]. The significance of COSS model for the early solar system warrants a second opinion with closer experimental scrutiny. If the COSS model stands the test of experimental verification, it has major implications for the origin and transport of water in the Solar System that governs the ultimate habitablility of planets.

Our VUV laser system can generate 4-5 orders of magnutide higher optical resolution, with brightness more than 6 orders of magnitude greater than the broadband synchrontron light source at ALS at LBNL. This will ensure higher signal-to-noise ratios when studying weak transitions or transitions of less abundant isotopologues, such as $^{13}C^{17}O$. Our initial finding supports a 'slope-1' ^{16}O depletion line as the COSS model postulates and observed in the early solar system material and now observed in the Sun [9].

[1] Clayton, R. N. (2002) *Nature* **415**, 860. [2] Yurimoto & Kuramoto (2004) *Science* **305**, 1763. [3] Lyons & Young (2005) *Nature* **435**, 317. [4] Yin, Q.-Z. (2004) *Science* **305**, 1729. [5] Chakraborty *et al*. (2008) *Science* **321**, 1328. [6] Lyons *et al*. (2009) *Science* **324**, 1516a. [7] Federmann & Young (2009) *Science* **324**, 1516b. [8] Yin, Q.-Z. *et al*. (2009) *Science* **324**, 1516c. [9] McKeegan *et al*. (2011) *Science* (in press)