Structural phase transition of ammonia hydrate under high pressure

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High pressure Raman scattering studies and angle-dispersive synchrotron x-ray diffraction measurements have performed on water-ammonia binary system up to 29.92GPa and 45.11GPa, respectively. Moreover, with pressure increased slowly, it was found from microscope that the appearance of lozenge blocked solid in the sample chamber at 3.48GPa. Compared with the Raman spectrum of ice and solid ammonia, we observed that the new appeared solid was ammonia hydrate. Hence, Raman spectrum of water-ammonia binary system and ammonia hydrate would be obtained at same pressure, respectively. Therefore, it was observed that the water-ammonia binary system transformed from liquid to solid phase at 3.8GPa but the ammonia hydrate had no phase transition up to 20.34GPa because of the disappearance of Raman spectrum. However, high pressure angle-dispersive synchrotron x-ray diffraction measurements showed that there was a solid to solid phase transition of ammonia hydrate at about 20GPa. And the mechanism of this phase transition is in processing.

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Characteristic of mineral component in carlin-type gold deposit in Qinling area

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Introduction

The intergrowth combination of ore mineral in different Carlin-type gold deposits in the Qinling area are roughly consistent, and, the gold mainly forms in the first stage of the hydrothermal period—arsenic-rich sulfide phase, Gold existed mainly in the form of native gold with irregular granular shape, secondly, it assumes the sub-microscopic gold existing in the arsenic sulfide.

Experiment and Results

Gold minerals output mainly in the form of native gold and have irregular granular primarily, also show the shape of flake, clavate, arborization and so on. Particle size are generally small and mostly exists as the form of microscopic gold - sub-microscopic gold, a few may be visible to the naked eye. Most of the sub-micro golden are located within the arsenic-sulfide mineral (80.4%~85.2%). The major minerals are the arsenical pyrites and arsenopyrite, in the next place are the tennantite, the realgar, the orpiment, the stibnite and so on, sometimes associated with the few chalcopyrite, the galena and the sphalerite. It has the characteristic of proliferation annulus in crystal grain interior of the arsenical pyrites, according this, may determine the ore deposit type and the provide effective prospecting method.

In the metallogenesis hydrothermal stage of ore deposit, arsenic pyrite and arsenopyrite is the gold-bearing mineral crystallized earliest and distributed widely in most deposits, however, the arsenopyrite content change large in the different ore deposit. Minerals above constituent uppermost stage of gold mineralization—rich-arsenic sulfide stage, this stage has formed the stable Au-As element combination and the mineral association, the stibnite, the cinnabar, the realgar and the orpiment forms late and fill in opening space with vein shape. After rich-arsenic sulfide hydrothermal stage, appear the vein with intense silicification, calcilized and the barite arteries, the veins forms in the late stages of metallogenesis under oxidation.In this stage, gold-bearing arsenic sulfide has suffered intense oxidation and hydrolysis, submicroscopic gold dissociating has obvious enrichment in the surface.