

Mineralogical Characteristics of Dickite in Zijinshan (ZJS) Au-Cu Deposit

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Abstract: Dickite is a type of clay mineral which could be utilized in industries such as papers, ceramics, paints, cosmetics and fillers. In this research, three types of dickite (transparent, translucent, and opaque) and one type of dickite which is widely found in open pit (leaching dickite) were selected, and their mineralogical characteristics were systematically investigated and compared by using Electron Probe Microanalysis (EPMA), X-ray diffraction (XRD), Fourier Transform Infrared spectroscopy (FT-IR) and Field Emission Scanning Electron Microscope (FESEM). Transparent dickite is low ordered degree and poorly crystallized exhibited by XRD and FT-IR analyses. The order degree and crystallinity increase with the transition from translucent dickite to opaque dickite. The order degree could be interpreted as the displacement of Al vacancies, and crystallinity referred to crystallization degree that could be used to describe the crystal structure of dickite. The order degree is correlated to the crystallinity, which could describe the crystal structure of dickite. Opaque dickite has the best developed and the most compacted plates with the maximum size of 5 μm wide crystal revealed by FESEM images. Leaching dickite with layers stack to each other pseudo-hexagonal; many small holes in them and some edges of layers are dissolved by the acid liquid. Moreover, impurities especially the FeO contents are few which could be utilized in the paper-coating and catalytic industry. It could be concluded that high order degree of dickite such as opaque and leaching dickite are easier intercalated with other materials which are suitable for the usage in metallic nano-composites. According to the mineralogical characteristics of different dickite, the hypothesized schemes of dickite forming is established which helps to gain a clear idea of the origin of Au-Cu deposit.

Keywords: dickite; mineralogical characteristics; ZJS Cu-Au deposit