

Geochemical Characteristics and Genesis of Quartz Jade from Jingshan Area, Hubei Province, China

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Abstract: Jingshan jade is a new kind of quartz jade which is from Baokang Country, Hubei Province, China. Based on geological exploration, polarized microscope, XRD and geochemical analyses, main elements, rare earth elements, silicon isotope and oxygen isotope of breccias and cements of samples collected from Shangjiagou area were analyzed to present geochemical characteristics and unveil the formation mechanism of quartz jade from Jingshan area. Results indicate that main mineral composition of quartz jade from Jingshan area is quartz, with secondary minerals of goethite and hematite. Quartz jade from Jingshan area shows brecciated and fragmented structures. Most samples' contents of SiO_2 are higher than 95%, followed by Fe_2O_3 that determined the color of quartz jade, and a small amount of Al_2O_3 , MgO , CaO and etc. The REE content of quartz jade from Jingshan area is very low and $\delta\text{Ce} < 1$ with Ce negative anomaly, however, Eu anomaly is slightly positive with enriched LREE, indicating that the formation of quartz jade from Jingshan area was affected by hot water activity. The $\delta^{30}\text{Si}$ and $\delta^{18}\text{O}$ values of quartz jade from Jingshan area are in the range of $-0.8\text{‰} - 0.9\text{‰}$ and $17.3\text{‰} - 23.1\text{‰}$, respectively, which were located in hydrothermal quartz and quartz in hot sinter, indicating that the silica is derived from hydrothermal quartz and deposited in the form of opal or gelatinous of SiO_2 . Then they were converted to quartz during diagenetic process. Finally, intense tectonic activity and hydrothermal metasomatism changed quartz into poikilitic quartz, eventually forming a colorful quartz jade.

Keywords: Jingshan jade; geochemical characteristics; silicon and oxygen isotope; deposit genesis