



Fluid Inclusion and Stable Isotope Studies of Gold-bearing Veins from the Masomebare Gold Field, Pala Area, Republic of Chad

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The Masonebare gold field is located in Pala area of southern part of Chad and is exposed by the Archean Pala greenstone belt(25x35km) extending to northeast. The auriferous quartz veins striking of N60°E and dipping of 43°SW occur as tabular form less than thickness of 0.8m in the fault shear zones of green mica schist. Gold occurs as free visible free grains and fine disseminated grains or small aggregates of sulfide ore minerals such as pyrite, galena, chalcopyrite, sphalerite. Analytical data of vein samples show ore grades as follows: Au:~703ppm(average, 105ppm), Ag:~ 4,960ppm(average, 300ppm), Zn: ~141ppm, Sb and Cr:~50ppm. Thermometric measurement data revealed that homogenization temperatures of liquid-rich inclusion from 230 to 290 [U+2103] with salinities of less than 8.5 eq.wt.% NaCl. CO₂-rich inclusion contains CO₂ of less than 14 mole.% and homogenized at temperatures of 260~290 [U+2103]. Phase separation of fluids by CO₂ effervescence may be intensively activated around at temperature of 260~290 [U+2103] under less than 1.6 kbars. Thermodynamic relationship show that ore fluids evolved from near 300 [U+2103] with log fS₂=-8atm to a later low temperature (250 [U+2103], log fS₂=-10atm). Phase separation of fluids by CO₂ effervescence may be intensively activated at temperature of 350~250 [U+2103] during mineralization of Massonebare area. Gold transport as the AuCl₂⁻ complex is favored in relatively high temperature fluids(=300 [U+2103]). The calculated isotopic fluid compositions (D = -52.1 to -23.2‰ and 18O = 2.1 to 9.0‰) overlap the range of the plutonic-volcanic-hosted Archean gold deposits. ³⁴S/ΣS of ore fluids ranges from 2.8 to 4.6‰ based on the fluid inclusion and isotope equilibrium temperatures. We therefore interpret the source of sulfur from the Massonebare ore fluids as a igneous source.