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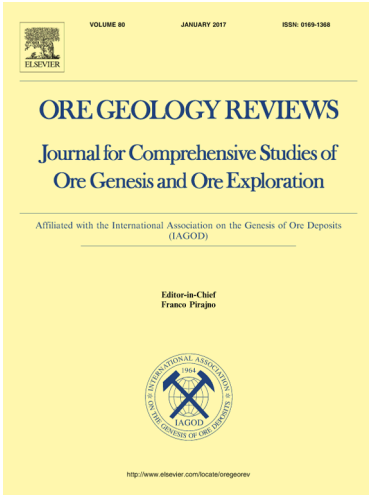

Genetic implications of fluid-deposited disordered graphite and methane-rich inclusions in the Jonnagiri granodiorite-hosted gold deposit, Eastern Dharwar Craton, India

Sakthi Saravanan Chinnasamy, Biswajit Mishra

PII: S0169-1368(17)30161-0
DOI: http://dx.doi.org/10.1016/j.oregeorev.2017.07.006
Reference: OREGEO 2276

To appear in: *Ore Geology Reviews*

Received Date: 27 February 2017
Revised Date: 29 June 2017
Accepted Date: 7 July 2017

Please cite this article as: S. Saravanan Chinnasamy, B. Mishra, Genetic implications of fluid-deposited disordered graphite and methane-rich inclusions in the Jonnagiri granodiorite-hosted gold deposit, Eastern Dharwar Craton, India, *Ore Geology Reviews* (2017), doi: http://dx.doi.org/10.1016/j.oregeorev.2017.07.006

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Genetic implications of fluid-deposited disordered graphite and methane-rich inclusions in the Jonnagiri granodiorite-hosted gold deposit, Eastern Dharwar Craton, India

Sakthi Saravanan Chinnasamy[1*] and Biswajit Mishra[2]

[1]*Department of Earth and Atmospheric Sciences, National Institute of Technology, Rourkela 769008, India*

[2]*Department of Geology and Geophysics, Indian Institute of Technology, Kharagpur 721302, India*

Abstract

Laminated quartz veins, occurring within sheared granodiorite in the Jonnagiri greenstone belt, host lode gold mineralization. The greenstones were metamorphosed to lower amphibolite facies condition. Hydrothermal alteration produced inner zone of auriferous laminated quartz vein and contiguous proximal zone within the sheared granodiorite. Detailed fluid inclusion studies by Saravanan et al. (2009) reveal presence of three types of fluid inclusions. These are type-I aqueous-gaseous, type-II gaseous and type-III low saline aqueous inclusions. Raman spectroscopic studies performed in this study, on type-II inclusions in quartz veins from the inner and proximal zones reveal presence of disordered graphite, occurring as thin films within fluid inclusions, apart from variable proportions of CO_2, CH_4 and H_2O. Perple_X -aided phase diagram computations were carried out in the C-O-H system at 300 ºC and 2 kbar to examine the chemical evolution of the C-O-H fluids. The calculated $\log f_{O_2}$ values on the graphite saturation surface range from –35.71 to –32.65 when X_O varies from 0.1 to 1.0. However, log f_{O_2} decreases significantly to –49.31 at X_O = 0.1E–07 that pertains to the stability of almost pure CH_4. Nearly similar $\log f_{O_2}$ values were reproduced from the calculations using the COH spread sheet. Decrease in f_{O_2}, as demonstrated by the occurrence of gaseous fluid inclusions with disordered graphite and varying proportions of

E-mail address: *geosaks@gmail.com/chinnasamys@nitrkl.ac.in

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