

Mineral chemistry of chlorite as a method for geothermometry of hydrothermal alteration from Qezildash sulfide deposit, NW IRAN

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(Received: 18/9/2009, in revised form: 17/1/2010)

Abstract: Chlorite group minerals have a wide range of chemical compositions which reflect the physicochemical conditions of their crystallization. The solid solution (cationic substitution) model in crystal lattice of chlorite were satisfactorily used in estimation of its formation temperature in different geologic environments such as ore deposits, low-degree metamorphism, hydrothermal alteration and diagenesis by some researchers. In present research, the chlorite geothermometry method was used in the estimation of temperature of hydrothermal alteration and massive sulfide mineralization in the Qezildash area, northwest of Khoy city. In this work, at first, petrographic and mineralogical (XRD) studies were carried out on the samples taken from surface and borehole drilling cores. Eleven chlorite crystal grains which belong to different parts of hydrothermal system were selected and analyzed by electron microprobe equipment. Structural formulate were calculated on the basis of 14 oxygens. Chlorites have significant compositional variations and atomic solid solutions which reflect their formation temperatures. Chlorites from different parts of orebody and unmineralized altered rocks gave temperatures of formation of 318 to 368°C, and 202-210°C respectively. High-temperature chlorites have smaller Si contents than chlorites formed at low- temperatures.

Keywords: *Chlorite, Geothermometry, Solid solution, Alteration, Mineralization, Massive sulfide, Qezildash, Khoy.*

متن فارسی اصل مقاله از صفحه ۲۲۳ تا ۲۳۲ در این شماره به چاپ رسیده است.

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