
Applying X-Ray Geothermometer Diffraction to a Chlorite

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Abstract: A new method is proposed for applying the chlorite geothermometer using X-ray diffraction (XRD) data. A linear correlation has been found between the (001) basal spacing of chlorite and its "crystallization" temperature. The basal spacing values were corrected for an increase of Al(IV) with Fe enrichment (Fe/Fe + Mg), when the Fe(II) value of chlorite is > 2.6 in the formula unit. The regression coefficient of the best fit is $r = 0.95$. Only 2 Bragg lines need to be measured for application of the proposed technique: the (001) and (060) X-ray spacing. The proposed method is applied to 19 chlorite samples from 4 different geothermal fields. The temperatures of chlorite formation obtained with the present method and those calculated by the expressions formulated by Cathelineau (1988) and Kranidiotis and MacLean (1987) are presented. The method's validity was also tested on geothermal chlorites from the literature, and the results show good agreement with previous experimental trials.

Key Words: Chlorite Geothermometer • X-Ray Diffraction

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