

Fine structure of infrared OH-stretching bands in calcic amphiboles

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Infrared OH-stretching bands of calcic amphiboles have been assigned. Three types of band systems are observed with decreasing bands frequency: (1) band system of the (M1M1M3)-OH-(Na/K):SiAl configurations at 3725~3650 cm⁻¹), (2) band system of the (M1M1M3)-OH-V:SiSi(V=vacancy) configurations at 3680~3620 cm⁻¹), and (3) band system of the (M1M1M3)-OH-V:SiAl configurations at 3650~3580 cm⁻¹). The band system attributed to the (M1M1M3)-OH-(Na/K):SiSi configurations at 3740~3680 cm⁻¹) are obscure, indicating a short-range order in calcic amphiboles of the T1-T1 = Si-Al configuration is predominant when the A-site is occupied with Na or K.

Infrared OH-stretching bands of calcic amphiboles have been assigned. Three types of band systems are observed with decreasing band frequency: (1) bands A*(T)~D*(T) of the (M1M1M3)-OH-A(Na/K):SiAl configurations at 3725~3650 cm⁻¹), (2) bands A~D of the (M1M1M3)-OH-V:SiSi(V= vacancy) configurations at 3680~3620 cm⁻¹), and (3) bands A(T)~D(T) of the (M1M1M3)-OH-V:SiAl configurations at 3650~3580 cm⁻¹). The band system of A*~D* attributed to the (M1M1M3)-OH-A(Na/K):SiSi configurations at 3740~3680 cm⁻¹) are obscure, indicating a short range order in calcic amphiboles of the T1-T1 = Si-Al configuration is predominant when the A-site is occupied with Na or K. The combinations of the M1 and M3 sites for designated bands A-group A*, A*(T), A(T) to D-group (D*, D*(T), D(T)) are: A = (MgMgMg), B = (MgMgFe(2+)), C = (MgFe(2+)Fe(2+)), D = (Fe(2+)Fe(2+)Fe(2+)), respectively. Wavenumbers for the A~D bands are materially independent with the chemical compositions, however, those for other systems shift downward ~8 cm⁻¹) with increasing Fe(2+) contents. Most of these bands more or less overlap each other, however, bands C, C(T) and D(T) do not overlap.