

morphous replacement of  $2Ca \rightleftharpoons Na^+Y^{3+}$  takes place. The large cavities in this framework are occupied by K, Na and  $H_2O$ , which are most probably responsible for pseudo-cell. K-delchaelite is the first known member of the delchaelite family, the end member of which is hydrodelchaelite. The mentioned and related TR-, Ca- silicates are given.

Fe-bearing hornblendes ( $0.75 \leq X_{Fe^{2+}} \leq 0.85$ ) have the highest value of  $\Delta V_{mix}$  ( $\sim 4 \text{ cm}^3/\text{mol}$ ).

The behaviour of structural characteristics and molar volumes of natural solid solutions Ca-rich pyroxenes and amphiboles allows to make some critical estimations of given in literature calculations of excess thermodynamical mixture functions of solid solutions of the same composition.

08.4-44 CRYSTAL STRUCTURES OF NATURAL SOLID SOLUTIONS OF Ca-RICH PYROXENES AND AMPHIBOLES. By A.V.Maslenikov, Institute of Precambrian Geology and Geochronology USSR Academy of Sciences, nab. Makarova, 2, Lenin-grad 199164 USSR.

The structures of four natural Ca-rich pyroxenes of diopside-hedenbergite series (with  $Fe^{2+}$  content from 0.04 up to 0.81 per form. unit) have been refined. The nonadditive variation in M1-O and M2-O distances and their relationship with  $Fe^{2+}$  content are determined. Deviation from Vegard's law is negative. Unit cell parameters of the natural pyroxenes of the same composition are calculated on the X-Ray powder diffraction data. Concentrational relationship of the molar volume is similar to variation of structural characteristics and shows the nonideality of natural solid solutions of Ca-pyroxenes. Maximum value of  $\Delta V_{mix}$  is equal to  $-0.5 \text{ cm}^3/\text{mol}$  when  $0.25 \leq X_{Fe^{2+}} \leq 0.4$  per form. unit.

Values of molar volumes of 120 natural amphiboles of isomorphous series tremolite-ferroactinolite ( $Al_{IV}$  content up to 0.10 and  $R_{YI}^{3+}$  up to 0.05 per form. unit), actinolitic hornblende ( $Al_{IV}$  up to 0.75,  $R_{YI}^{3+}$  up to 0.20 per form. unit) and hornblende are calculated on the X-Ray powder diffraction data. Concentrational relationship of molar volume of natural amphiboles has the positive deviation from Vegard's law that indicates the nonideality of this solid solutions. The samples of

08.5-1 THE MAGNETIC STRUCTURE OF FAYALITE FROM  $^{57}Fe$  MÖSSBAUER RESONANCE. By G. Amthauer<sup>1</sup>, H. Fuess<sup>2</sup>, S.S.Hafner<sup>1</sup> and W.Lottermoser<sup>2</sup> Institut für Mineralogie der Universität Marburg<sup>1</sup> and Institut für Kristallographie und Mineralogie der Universität Frankfurt<sup>2</sup>, W.Germany

Fayalite  $Fe_2SiO_4$  (Pnma) is antiferromagnetic below  $T_N=65K$ . Two somewhat different magnetic structures were reported (Cox et al., Abstracts Am.Cryst.Assoc.Meet. (1965) 47; Santoro et al., J. Phys. Chem. Solids (1966) 27, 655). We studied the magnetic Mössbauer spectra of  $^{57}Fe$  in a powdered single-crystal fragment of synthetic fayalite at 5.5 and 40K. The spectra were fitted by a direct solution of the Hamiltonian for the  $^{57}Fe$  magnetic and electrostatic interactions, using the least-squares procedure. The assignment of the two subspectra to 4a and 4c is possible from the somewhat different temperature dependence of the  $^{57}Fe$  quadrupole interaction  $\Delta$  at 4a and 4c between 5.5 and 700K:  $\partial\Delta(4a)/\partial T < \partial\Delta(4c)/\partial T$ . The values obtained from the fits of the spectrum at 5.5K are (the first value corresponds to 4a, the second one to 4c): 320 and 117 kOe for the local magnetic field  $H_{eff}$ , +3.09 and +3.04 mm/s for  $\Delta$  and 0.19 and 0.75 for the asymmetry parameter  $\eta$ ; at 40K we got 152 and 72 kOe for  $H_{eff}$ , +3.08 and +3.01 mm/s for  $\Delta$  and 0.26 and 0.83 for  $\eta$ . The values for 4a are in good agreement with the previous data of Kündig et al. (J.Appl.Phys. (1967) 38, 947). However, at 4c we find a small inclination  $\theta$  between  $H_{eff}$  and the eigenvector Z of  $\Delta$  of 5-8 degrees. This is inconsistent with the crystallographic space group Pnma which was assumed by Kündig et al. for their early spectra ( $\theta=0$ ). The results will be discussed in connection with recent neutron diffraction single-crystal data.