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Cation ordering in Ni–Fe olivines: reply

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Ribbe and Lumpkin (1983) have drawn our attention to some errors in our paper Annersten *et al.* (1982). We have reexamined the sample H 11, having $X_{Ol}^{Fe} = 0.52$ and the new cell parameters of the powder sample used in our Mössbauer investigations are, a = 4.749(5), b = 10.335(7), c = 6.004(8)Å, and V = 294.7(7)Å^3. The standard deviation in the measured cell parameters of this sample is, however, still large.

The correction factors we applied to the observed intensities of the absorption doublets take care of the different Debye temperatures of ^{57}Fe in M1 and M2 sites in olivine (Gibb and Greenwood, 1971); they are small, and the empirical values are obtained from spectra measured at different temperatures. It can of course be argued that other errors such as bad resolution, thickness effects, *etc.* will dominate over the simple assumption of equal recoil free fractions. These corrections are rarely considered in Mössbauer spectroscopy, although the difference in recoil free fraction is enhanced at elevated temperature.

It is very interesting to compare the different methods in probing the order–disorder situation in olivines developed by Ribbe and Lumpkin. We have plotted our Mössbauer data (Annersten *et al.*, 1982) in the *a–b* plot (see Fig. 1) and the agreement with the observed cell parameters is apparently good, since both types of data cluster around the same curve (K_D = 0.10). However, the Mössbauer results indicate a higher degree of order than the *a* and *b* parameters do. This may indicate that particularly the *b*-dimensions do not fully account for the order–disorder in olivine. One reason for this may be the non-linear behavior of the *b*-dimension with increasing octahedral substitution. Present work on the Fe–Mn olivines by Annersten *et al.* (1984) will support this idea.

Finally we apologize for the apparent mistakes appearing in our earlier paper and we thank Ribbe and Lumpkin for informing us.

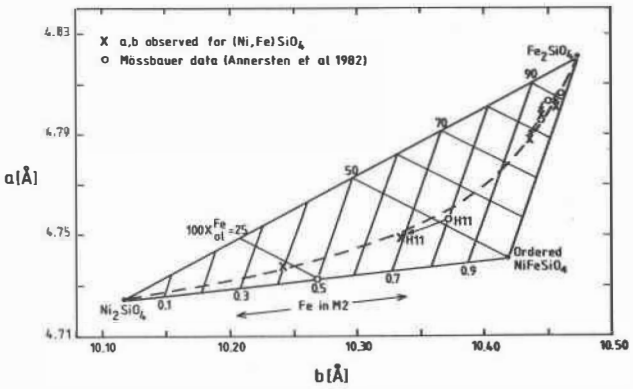

Fig. 1. a–b plot from Ribbe and Lumpkin (1983). Mössbauer data are based on data from chemical analysis and observed iron site occupancy.

References

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