An Iron-57 Mössbauer Spectral Study of $Na_{1-x}Li_xMnFe_2(PO_4)_3$

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The Mössbauer spectra of the $Na_{1-x}Li_xMnFe_2(PO_4)_3$ compounds, with x = 0.00, 0.25, 0.50, and 0.75, have been measured between 80 and 295 K. The iron-57 Mössbauer spectra of these compounds have been succesfully analyzed with a simple binomial model which takes into account the four next-near neighbour configurations of the cations on the M(2) crystallographic sites. Furthermore, it has been shown that the substitution of sodium by lithium has at most a small influence on the values of the isomer shifts and quadrupole splittings. More unexpected is a clear decrease in the fraction of Fe^{2+} occupying the M(2) site with increasing lithium content, a decrease which results from a decrease in the unit cell volume with increasing lithium content.