# CRYSTALLINE PROPERTIES OF NICKEL FERRITE-ALUMINATES

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The crystalline and magnetic properties of nickel ferrite--aluminates $NiFe_{2-t}Al_tO_4$ /$0<t\leq 2$/ have been the subject of many investigations performed with different methods. In this paper we report the experimental results of crystalline properties of the t=0.75, 1.0, 1.25, 1.5, 2.0 samples obtained with X-ray, neutron diffraction and Mössbauer effect methods. The experimental details are described elsewhere /1/.

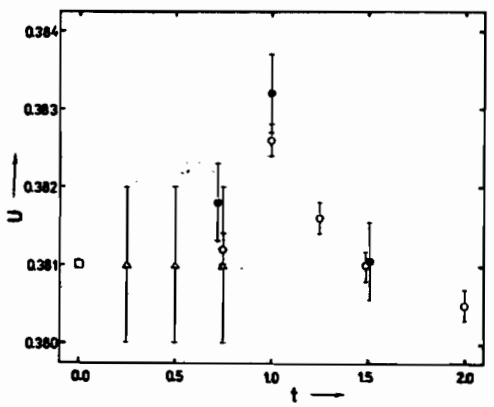


Fig.1. o /this work/; ● /2/; □ /3/; △ /4/

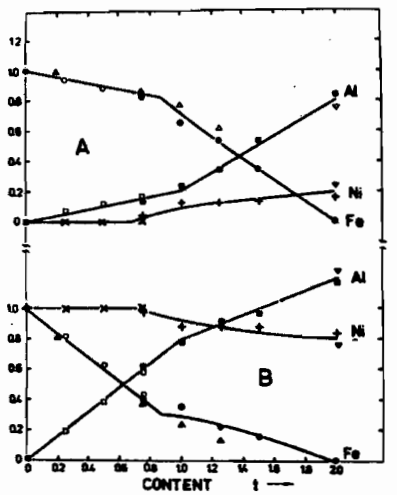


Fig.2. ●, ■, + neutron data /this work/; △, ▲ ME data /this work,5/; o, □, × X-ray data /4/; ▽, ▼ X-ray data /6/

The variation of the oxygen parameter u with the sample composition t is shown in Fig.1. Fig.2 shows the experimental and calculated results of the cation distributions for different t values.

The experimental results may be explained with the equilibrium cation distributions model /7/. According to it, for the t values varying from zero to about 0.9 the aluminium cations replace the iron cations in the A and B sites linearly with the probability ratio 1:4. There is no exchange of the nickel cations between the A and B sites. For the t values varying from 0.9 to 2.0 the aluminium cations are embedded into the A and B sites with the probability ratio 3:2. The corresponding ratio for the replacement of the iron cations is slightly higher than 3:2 due to the replacement of the nickel cations from the B sites to the A sites /solid lines in Fig.2/. The cation distributions derived from the experimental data /Fig.2/ are with a good agreement with those predicted by the cation distributions model. There is a difference of the above mentioned ratios at the t value of about 0.9 which should imply the discontinuity of the crystalline properties. Such discontinuity is clearly seen for the oxygen parameter u /Fig.1/.

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