# THERMAL EXPANSION OF STOICHIOMETRIC AND VACANCY-CONTAINING MG, AL SPINEL

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A single-crystal X-ray investigation was performed on three synthetic Mg, Al spinels (A, B, C). A and B are stoichiometric Mg Al2O4, equilibrated at 600 and 800°C respectively. The chemical formula of crystal C, synthesized with the Verneuil method, is Mg0.40 Al2.40 ?0.20 O4. A single set of non equivalent 88 reflections was collected in steps of 100° up to 1000°C. Several reversal runs were performed down to room temperature, and again some data were collected up to 1000°C. The main results are as follows.As a mean, the ao increase is about 0.006Å for 100°C, but it is not linear. Crystal C shows values of positional oxygen parameter u equal at all temperatures within one or two standard deviations. As a consequence of ao and u behaviour, both T-O and M-O increase regularly with increasing temperature. In crystals A and B u remains constant up to the equilibration temperatures, and then strongly decreases as a consequence of Mg-Al disordering. This causes shortening of the T-O bond which, at 1000°C, returns to values equal to or lower than those at 25°C. Consequently, the increase in ao is only due to the higher rate of the M-O increase during the disordering reaction.Up to 600-700°C, the T-O thermal behaviour of crystal C is very similar to that of stoichiometric samples A and B. This is surprising, since the Pauling bond strength of T site in much greater for C (0.65) than for A and B samples (0.55).