HEAT CAPACITY AND ELASTIC CONSTANTS OF $Fe_{3-x}Zn_xO_4$ IN THE VICINITY OF THE VERWEY TRANSITION

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We report on the heat capacity and elastic constants studies of $Fe_{3-x}Zn_xO_4$ ($x < 0.04$) series. Adiabatic heat capacity measurements, performed on single crystals, show the clear change of the transition character from the first order for a low Zn content ($x < 0.012$) to higher order in the $0.012 < x < 0.035$ regime. Change of the transition order is accompanied by change in the heat capacity baselines below the Verwey transition temperature T_V. Elastic constants measurements indicate that c_{11},(c_{11}-c_{12}) and c_{44} modes exhibit anomalies at T_V but only the shear wave c_{44} show critical softening while approaching the transition from high temperatures. This behavior, related to the results obtained by the heat capacity studies, point to the important role of lattice contribution to the mechanism of the Verwey transition.

9.7 cm

13.4 cm

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