Electron-lattice interactions in magnetite

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It is shown that the dependence of the details of the Verwey transition on combined electron-phonon effects was experimentally proved already long time ago. Apart from the simultaneous electronic as well as structural character of the transition, the isotope effect was very pronounced. Also, two critical effects were seen in the observation of the diffuse scattering of neutrons and X-rays, undoubtedly connected to the transition. While elastic constants studies and the results of heat capacity experiments pointed to lattice preparation to the transition starting already at 300 K and to a different change of lattice depending on the transition order, the direct confirmation of the change of phonon spectrum was derived from nuclear inelastic gamma ray scattering. All these experimental results and those aimed to study the electronic structure, *e.g.* photoemission, preceded the recent theoretical outcomes that point to elastic-electron interactions as the driving force of the Verwey transition.

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