On the theory of phase transition Landau

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We consider close-packed structure with defects, which undergoes structural phase transition, and we research dependence of critical exponents on concrete kind of defects distribution. The analysis shows, that the connectivity distribution function of defects in structure can be presented by the generalized Boltzmann factor, as it is done in superstatistics. Namely, the distribution of defects in close-packed structure can be considered as the process of homogeneous growth. Using a maximum entropy principle it is possible to show, that in this case we have an exponential distribution of defects connectivity. If the spatial distribution of defects in structure is random, then, generally, the number of entering links will be random variable. For example, if this distribution is gamma distribution we obtain the analogue of Tsallis distributions. Other spatial distributions of defects generate infinite number different distributions. For a statistical mechanical foundation we use a maximum entropy principle, which allows to obtain the generalized Boltzmann factor that allows to obtain the concrete distribution links of defects. Namely from a entropy functional on which the constraints we are imposed and we define the distribution function of defects in the system. The maximum entropy principle, which was used in no extensive statistical mechanics, allows derive the generalized Boltzmann factor. It allows to obtain various distribution functions connectivity of defects in structure by a unified way.

For the analysis of defects distribution dependence critical exponents we introduce a free energy functional, which depends on an order parameter and on connectivity distribution of defects of structure. The symmetry of an order parameter is defined by an irreducible representation of a space group of structure. After the procedure an average of a free energy functional on connectivity of defects (practically it implies calculation a moments of the distribution) we obtain, that the critical behaviour strongly depends on the form of the distribution function and can essentially differ from of the mean-field behaviour. The analysis of experimental results shows, that such situation is characteristic for doped layered crystals (system with competing interaction).