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Investigation of phase transformations of iron nanoparticles during thermal annealing

A study was made of changes in the structural properties and phase composition of nanoparticles based on iron oxide. For the analysis of phase transformations, Mossbauer spectroscopy, X-ray diffraction and scanning electron microscopy were used. According to the data of XRD and Mossbauer spectroscopy, an increase in the annealing temperature, as well as subsequent phase transformations of magnetite into maghemite and then to hematite as a whole. According to the data of Mössbauer spectroscopy at temperatures above 400 ° C, the lines of the characteristic for disordered iron oxide FeO disappear, which also confirms the improvement of the crystal structure of the nanoparticles.

Primary author: Ms TULEBAYEVA, Dinara (L.N.Gumilyov Eurasian National University)

Co-authors: Mr KOZLOVSKIY, Artem (The Institute of Nuclear Physics of Republic of Kazakhstan, Astana, Kazakhstan); Ms YERMEKOVA, Assel (Yermekovna)

Presenter: Ms TULEBAYEVA, Dinara (L.N.Gumilyov Eurasian National University)

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