

The subject matter of the present work is a study of a series of single crystal samples of magnetite with substitutions of zinc and titanium by means of the NMR method. Ions of the zinc substitution Zn^{2+} replace a part of ferric ions at tetrahedral (A) sites, while the titanium ions Ti^{4+} occupy octahedral (B) sites replacing iron ions $Fe^{2.5+}$. Hyperfine interactions and local electronic structure are sensitive to the presence of substitution. The case when the valence of the substitution ion is different from that of the replaced ion is of a particular interest. Resonance frequencies of nuclei in the neighbourhood of the substitution are shifted due to the modified hyperfine field, thus satellite lines can be observed in NMR spectra. Temperature dependences of spectra above the Verwey transition were measured in a zero external magnetic field. Additionally, NMR spectra were also acquired at the temperature of 4.2 K. Temperature dependences of frequencies of main lines and satellite signals in the spectra above the Verwey transition were constructed and compared to the data for pure magnetite and magnetite with other substitutions and with cationic vacancies. Furthermore, variations of widths of A lines against the temperature above the Verwey transition were found and discussed.