The doctoral dissertation covers the subject of the production of $BaBi_2Nb_2O_9$ ceramics, which belongs to the materials of the Aurivilius type structure. The research material was modified with the ions of rare earth elements, i.e., samarium and praseodymium, into the A subnetwork and the bismuth-oxygen layers.

The test material was produced using conventional technology, i.e., solid-phase synthesis and free sintering in air. Its structural and microstructural characteristics were performed using the following methods: X-ray phase analysis (XRD), scanning electron microscopy (SEM) and energy dispersion spectroscopy (EDS). In order to determine the basic mechanical properties of the produced ceramics, Young's modulus, the stiffness modulus and Poisson's ratios were determined. Based on a detailed analysis of temperature and frequency characteristics of electric permittivity, the influence of doping on the dielectric properties of the base material was discussed. On the other hand, impedance spectroscopy tools allowed the study of the applied modifications' role in the conductivity processes in the tested material.