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THE STUDY OF FERROELECTRICS IN THE HISTORY OF PHYSICS

Ferroelectrics are characterized by a large number of abnormal dielectric and other physical properties that are linked with thermodynamic relations. These anomalous features were found in crystals of Rochelle salt. The terms *"ferroelectric"* and *"ferroelectrics"* come from the name of this salt. These terms were introduced into science by I. V. Kurchatov. The dielectric properties of ferroelectrics are similar to magnetic properties of ferromagnets. In 1880 French physicists Jean and Pierre Curie discovered and investigated the phenomenon of abnormally large electric polarization of Rochelle salt crystals under the influence of mechanical stress (piezoelectric effect). Abnormally high dielectric properties of Rochelle salt were discovered by American scientists J. Valashek in 1921. Fundamental investigations of Rochelle salt anomalies were done in 1930 by Soviet physicists I. V. Kurchatov and P. P. Kobeko. B. M. Vula and I. M. Goldman in the former USSR, Weiner and Solomon in the USA, S. Ogawa in Japan discovered anomalous dielectric properties of barium titanate, which due to its physical and chemical properties got wide practical application, thereby activating both theoretical and experimental researches of ferroelectrics.

Nowadays, there are more than 600 of ferroelectric materials, 2/3 of them are double and triple metal oxides (titanates, zirconate, niobates, tantalates, phosphates, borates, nitrates, etc.), but there are organic compounds, polymers, liquid crystals. Facts about ferroelectric phenomena and the structure of ferroelectrics are growing fast with the help of modern research methods (nuclear magnetic and electron spin resonance etc.) and the study of them already became a separate field of physics.

In ferroelectric crystal a spontaneous polarization can be caused by all three types of polarization: *electronic, ionic and orientation*. These components have different impact on the total polarization depending on the atomic structure of crystals, the nature of chemical bonds, physical characteristics of the constituent atoms, as well as external conditions (electric fields, temperature, pressure, etc.).

In conclusion, ferroelectric is also called a polar crystalline dielectric, which is in a certain range of temperatures spontaneously polarized, and the vector of spontaneous polarization depends on external influences (electric field, temperature changes, etc.).

LITERATURE

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