NEW MULTIFERROICS MATERIALS

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Project description:

Multiferroics are single-phase materials that can simultaneously exhibit at least two of the properties (arrangements) such as ferromagnetism, ferroelectricity, ferroelasticity or ferrotoroidicity. The most important multiferroics are magnetoelectric materials in which the external magnetic field allows changing the electric polarization and vice versa applied voltage changes magnetization. An example is $BiFeO_3$ bismuth iron ferrite exhibiting multiferroic properties even at room temperature. $Ca_2Fe_{2-x}Al_xO_5$ brownmillerites are also promising compounds because they are ionic conductors, magnetoresistive materials, and magnetoelectrics. Moreover their direction of magnetization can change rapidly under the magnetic field. The project involves the synthesis and investigations of various bismuth-doped brownmillerite $Ca_{2-x}Bi_xFe_{2-y}Al_yO_3$, which would combine the advantages and properties of the two materials mentioned above.

Aim of the project:

The development of methods for the synthesis of bismuth-doped brownmillerites, investigating of their structure and magnetic and electrical properties.