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# Study of crystal and magnetic structures of the complex cobalt oxide La0.5Ba0.5CoO3 at high pressures

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The crystal and magnetic structures of the compound La0.5Ba0.5CoO3 were investigated by neutron diffraction at high pressures. It was found that the magnetic phase of this compound is resistant to pressure at pressures up to 4.6 GPa.

## Summary

The type R1-xAxCoO3 compounds (R - rare earth, A - alkaline earth elements) are the objects of intensive experimental and theoretical investigations due to the presence of a number of interesting effects: structural and magnetic phase transitions, changes in the spin states of cobalt ions, various types of magnetic, orbital, and charge ordering, giant magnetoresistance etc.. In this regard, the cobalt oxides are promising materials for the production of solid-state fuel cells, alternative energy sources, and catalysts. Also in cobaltites, there is a close relationship between spin, charge and lattice degrees of freedom. The variation of interatomic distances and valence angles by various methods often leads to a significant change in the magnetic and transport properties.

Studies of the pressure effect on RCo2 compounds can give additional information about the magnetic behavior of cobalt in the ordered phases. Because the pressure is a direct method of controlled change of the interatomic distances and valence angles, which can lead to a significant change in magnetic and transport properties of various compounds.

In our work La0.5Ba0.5CoO3 cobalt oxide was investigated using neutron diffraction in the pressure range from 0 GPa to 4.6 GPa and in the temperature interval from 10 K To 290 K. At normal pressure and low temperatures until the compound has a cubic structure with space group Pm3m and has a ferromagnetic ordering with Tc = 180 K. When exposed to pressures up to 4.6 GPa in La0.5Ba0.5CoO3 the original crystal structure is retained. It was also found that the magnetic phase is resistant to pressure and has the same Curie temperature, and at P = 0 GPa.

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