

## Humidity-sensitive active elements based on alumomagnesium spinel-structured ceramics

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### Abstract

The spinel-type  $\text{AB}_2\text{O}_4$  (A: Mg, Zn, Co, Ge; B: Al, Fe, Cr, Ni, Sn) ceramic compounds are widely used as active elements of humidity sensors [1-3]. The wide range of the measuring humidity values (5-98%) is achieved in these sensors due to their specific porous structure, which promotes the effective cooperative adsorption of water molecules. The alumomagnesium  $\text{MgAl}_2\text{O}_4$  spinel is one of the most advanced representatives of this class of ceramics, extensively investigated in research laboratories from all over the world [3]. In this work, the results of complex and comprehensive investigations of microstructure features, adsorption-desorption kinetics of water, as well as optimization possibilities of technological process are discussed for humidity sensing elements based on alumomagnesium spinel-structured ceramics. The correlation relationships between specific surface of initial powders and sintered bulk ceramics, pore volume distribution and adsorption-desorption ability are established experimentally in order to obtain the high-quality humidity sensors. The degradation processes in  $\text{MgAl}_2\text{O}_4$  ceramic samples are studied. The technological route to prepare the high-sensitive humidity elements based on spinel-structured alumomagnesium ceramics is optimized, using statistical physics methods.

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