TECHNOLOGY FOR PRODUCING ELECTRICALLY CONDUCTIVE CERAMIC MULTILAYER TILE

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The rapid development of modern electronic technologies has contributed to the widespread use of various electronic devices, which has significantly increased the convenience of people's daily lives. However, researchers have discovered their practical impact on society, which is due to the large amount of electromagnetic (EM) waves they transmit into people's living spaces. This leads to the terrible problem of EM interference, which not only causes damage to highly sensitive electronic equipment, but also has a noticeable negative impact on the physical health of biological objects. Therefore, new microwave absorbing materials are highly desirable for scientific and technological development, and composite materials will play a significant and effective role in developing high-performance microwave absorbing materials.

To obtain the samples, the following raw materials were used in the work: a batch for ceramic tiles, SiC and $SrTiO_3$ as conductive and ferroelectric additives. Experimental samples of composite ceramics consisted of three layers and a glaze. The press powder for each of the three layers (layer I – press powder with the addition of SiC, layer II – press powder with the addition of $SrTiO_3$, layer III – press powder without electrically conductive impurities) was mixed separately, using the required amount of starting materials. The weighed components to obtain the charge were moistened, ground in a ball mill, after which the resulting slurry was dried, ground and passed through a sieve No. 05.

At the first stage, the ready-made press powder for the first layer was moistened to 8%, poured into a pressing mold and pressed using a pressure of 5 MPa. Similarly, the second layer was made using a specific pressure of 10 MPa. For the third layer (also with a humidity of 8%), the prepared mixture was evenly poured into the mold and pressed with a pressure of 18–20 MPa.

At the next stage, the formed tile was covered with a glaze. The formed, dried tiles with a glaze were fired in a silite furnace. The performance characteristics that meet the current standards of Ukraine were obtained by the samples using the following technological parameters: temperature rise rate of 10–12 °C/min, firing temperature of 1120–1140 °C, isothermal holding for 20 minutes.

According to the results of the X-ray phase analysis, after firing the tile under the specified technological parameters, the electrically conductive silicon carbide additive is preserved in the first layer in its original form, which is an important factor for protective properties against the effects of electromagnetic radiation by increasing the throughput for electromagnetic waves in the middle layer of the tile.

Further research will be aimed at studying the absorbing properties of the tile by determining the optimal amount of the ferroelectric additive $SrTiO_3$ and improving technological parameters.