

DEVELOPMENT OF MANUFACTURING TECHNOLOGY FOR PIEZOELECTRIC ELEMENTS AND ELECTROACOUSTIC TRANSDUCERS BASED ON VINYLIDENE FLUORIDE COPOLYMER FILM

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The paper describes the developed technological solutions for manufacturing piezo-active 180 μm thick film from a domestically made grade F-2ME vinylidene fluoride copolymer (PVDF) and electroacoustic transducers (EAT) based on it. The technology for manufacturing piezo-active film consists of stages of extruded PVDF film orientation stretching and its polarization in the field of corona discharge. The main criteria for choosing processing methods and regimes of piezo-active PVDF film manufacturing are considered in regard to achieving its high piezoelectric characteristics in a wide range of operating temperatures. The most advantageous design of volume-sensitive EAT regarding applicability to underwater acoustic devices was determined as multilayer packets of piezo-active film, electrically connected in series. The required sensitivity and electrophysical parameters of the transducer can be provided by adjusting the number of active elements and piezo-active layers. Electrical and mechanical contact between layers in the active element is provided by thin layers of conductive polymer glue, allowing the creation of constructs based on piezo-active film without conductive materials on its surfaces. It allows to simplify the technology of transducer manufacturing significantly and create active elements of various configurations by shaping a workpiece using mechanical and water jet cutting. The characteristics of the piezo-active film and EATs based on it are also demonstrated.

Key words: piezofilm PVDF, electroacoustic transducer.

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