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Fabrication and investigation of a transparent and flexible loudspeaker and microphone based on carbon nanotube

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Abstract

Transparent acoustic sensors and actuators are a new generation of acoustic transducers that can create an evolution in the microphone and loudspeakers industries. These transducers with properties like transparency, flexibility, flatness, very low weight and thickness have a great potential for various applications like public speakers, active noise cancelation systems, displays, cell phones and hidden microphones. In this investigation, fabrication of a prototype of these transparent transducers was the goal. In this research with coating multi wall carbon nanotube on PVDF substrate, a transparent acoustic sensor and actuator system was fabricated and characterized. After production of Carbon nanotube dispersed solution and surface modification of PVDF substrate, dip coating method was used for coating of CNTs on substrate. A coating with 75% transparency and surface resistance of 2.2 kΩ/sq was created. Then the fabricated transducer was tested in an anechoic chamber and results were compared with those of earlier researches. The fabricated transducer produced 58 dB sound under excitation with 25 V white noise.

Keywords: Acoustic sensor and actuator, Carbon Nanotube, Flexible loudspeaker.

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