Abstracts

Effect of Top Electrode Thickness on the Performance of Microwave Acoustic Transducers

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The effect of placing evaporated electrodes on the surface of thin-film microwave acoustic transducers is studied. In particular, it is found that the top electrode produces frequencies of infinite conversion loss (poles) within the usual operating passband of the transducer. The theory of thin-film microwave acoustic transducers is reviewed and utilized to find an analytic solution for the pole frequencies versus thickness of the top electrode. Theoretics results for Au, Ag, and Al top electrodes deposited on thin films of CdS and ZnO are presented. Experimental results for (Au/CdS), (Ag/ZnO), and (Al/ZnO) transducers are obtained by means of a novel swept-frequency pulse-echo method of measuring conversion loss. The theoretical and experimental results are found to agree within five percent. The relative advantages of transducers with the (Au/ZnO) and (Al/ZnO) configurations are compared, and designs for octave bandwidth operation are given for center frequencies ranging from 1.5 to 10 GHz.

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