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# Experimental characterization of a biomimetic differential microphone diaphragm. (A)



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The identification of mechanical properties for a microphone diaphragm based on the coupled ears of the fly *Ormia ochracea* and fabricated out of polycrystalline silicon is described. An acoustic test setup using a laser vibrometer has been developed that facilitates the characterization of the diaphragm on a bare die level. A major problem with using a laser vibrometer for acoustic measurement of microstructures is the close working distance between the sensor head and test device, resulting in measurements corrupted by reflections. Time select windowing procedures are often used to obtain anechoic response estimates from measurements taken in reverberant environments, but are not effective for characterization at lower frequencies or testing of lightly damped structures where the time window length needs to be more than the reverberation time. It is shown that the reflections from the measured response of the biologically inspired diaphragm can be reduced through comparison methods for the calibration of the sound field using a closely placed probe microphone and a commercially available pressure differential microphone. Equivalent mechanical parameters for the diaphragm are estimated with a least squares identification procedure. Characterization results for a diaphragm with two different back volume configurations are compared. [Work supported by NIH.] ©2008 *Acoustical Society of America*

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