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Analysis of coating characteristics of thin-film system DAVID DIDIE, DANIEL DIDIE, SUSHOVIT ADHIKARI, SANICHIRO YOSHIDA, Southeastern Louisiana University — Our previously developed opto-acoustic technique has been applied to evaluate the adhesion strength of thin-film coating on silicon-wafers. The goal of this research is to evaluate the effectiveness of pre-coating surface treatments on the substrate. We configure a Michelson interferometer with the thin-film surface of the specimen acting as an end-mirror, and oscillate the specimen from the rear with an acoustic transducer sweeping the driving frequencies in a range of 500 Hz to 30 kHz. One of the interferometric arms is slightly tilted so that the interferometric fringe pattern observed behind the beam splitter consists of vertical darks stripes. Here, the fringe contrast varies depending on the relative motion of the film surface to the substrate. This allows us to analyze harmonic response of the film, and thereby find resonance-like behavior of the interface. One emerging area for application of this type of thin-film systems is artificial knee joints. We are particularly interested in harmonic response of the film surface at low frequency ranges where human knee motions dominate in various modes of activity.

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