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Evaluation of thin-film adhesion with Opto-Acoustic System SUSHOVIT ADHIKARI, DAVID DIDIE, DANIEL DIDIE, SANICHIRO YOSHIDA, Southeastern Louisiana University — An opto-acoustic technique has been applied to evaluate the adhesion strength of a thin-film (Au/Ti, Pt/Ti or Ti) coating on silicon wafers. The specimens have been configured with a Michelson Interferometer as the end mirror, and are driven from the rear with an acoustic transducer so that the specimen oscillates in the direction of the optical axis at frequencies ranging 2 kHz – 30 kHz. Interferometric fringes are formed behind the beam splitter. The resulting film-surface displacement causes a shift in fringe (dark stripe) locations occurring at the driving frequency. For a given input power to the transducer, the amplitude of the oscillatory fringe-shift varies depending on the adhesion strength. On the fringe image formed by a digital imaging system at a sampling rate much lower than the driving frequency, the fringe oscillation is detected as a change in the fringe contrast (weaker adhesion makes the fringes blurrier), and its amplitude is quantified. Specimens with different pre-coating surface treatments have been tested. They are clearly differentiated by difference in the peak height and position in the frequency dependence of the fringe contrast.

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