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Determination of Thin Film Thickness

Thin films are used in the coating of various metals and can change the surface properties of their coated substrates to produce desired results in several applications. Faraday Technologies, a company based in Clayton, OH, is actively pursuing research in this field in order to determine optimal coating compositions and thicknesses for a variety of situations. They are currently searching for a fast, economic, and efficient method to determine the thicknesses of their coatings. A device produced by CSM Instruments, the Calotest™, boasts an ability to quickly and easily determine the thickness of metallic coatings ranging from 0.1 to 50 μm . This machine does so by spinning a stainless steel ball with a diamond slurry against the coated substance to produce a “scar” on the surface. Geometrical analysis of this scar via optical microscopy can determine the coating thickness, provided the scar is relatively symmetrical. The goal of this research project is to determine a proficient protocol for use of the Calotest™ in this and other thin film applications. Reported here are preliminary findings from this project in regards to test parameters and resulting scar characteristics, which have significantly informed the development of test protocols to be used in industry.