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Non-linear vibrational spectroscopies for characterizing thin films of semi-conducting polymers MARC GURAU, National Institute of Standards and Technology, ZACHARY SCHULTZ, DEAN DELONGCHAMP, BRANDON VOGEL, JOSEPH KLINE, YOUNGSUK JUNG, ERIC LIN, LEE RICHTER, CHEMICAL SCIENCE AND TECHNOLOGY LAB, NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY TEAM, MATERIALS SCIENCE AND ENGINEERING LAB, NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY TEAM — The ongoing development of conjugated polymer electronic materials has shown that alterations of the structure of these materials and the means of processing can lead to large variations in the performance observed. Continued growth in this field requires the development of new metrologies suited to the examinations of thin polymeric films on a variety of substrates. Spectroscopic characterization of the vibrational structure of these systems provides a non-destructive means of monitoring such changes. The work presented in this talk demonstrates the use of nonlinear optical broadband coherent anti-stokes raman spectroscopy (CARS) and broadband sum frequency generation (SFG) to monitor both the bulk and interfaces of ultra-thin (<50 nm) semiconducting polymer films. SFG provides insight into order at the critical buried polymer/dielectric interface of thin-film transistors while CARS provides insight into chemical degradation of the films.

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