Abstract Submitted
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Raman Spectroscopy of 3-D Printed Polymers[1] VANESSA ESPINOZA, Texas Lutheran Univ, ERIN WOOD, ANGELA HIGHT WALKER, JONATHAN SEPPALA, ANTHONY KOTULA, National Institute of Standards and Technology — Additive manufacturing (AM) techniques, such as 3-D printing are becoming an innovative and efficient way to produce highly customized parts for applications ranging from automotive to biomedical. Polymer-based AM parts can be produced from a myriad of materials and processing conditions to enable application-specific products. However, bringing 3-D printing from prototype to production relies on understanding the effect of processing conditions on the final product. Raman spectroscopy is a powerful and non-destructive characterization technique that can assist in determining the chemical homogeneity and physical alignment of polymer chains in 3-D printed materials. Two polymers commonly used in 3-D printing, acrylonitrile butadiene styrene (ABS) and polycarbonate (PC), were investigated using 1- and 2-D hyperspectral Raman imaging. In the case of ABS, a complex thermoplastic, the homogeneity of the material through the weld zone was investigated by comparing Raman peaks from each of the three components. In order to investigate the effect of processing conditions on polymer chain alignment, polarized Raman spectroscopy was used. In particular, the print speed or shear rate and effect of strain on PC filaments was investigated with perpendicular and parallel polarizations.

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