Abstract Submitted
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**Infrared and Raman Study of the Recluse Spider Silk**[1] S. L. WANG, Department of Physics, College of William and Mary, QIJUE WANG, Department of Applied Science, College of William and Mary, ZHEN XING, Department of Physics, College of William Mary, H. C. SCHNIEPP, Department of Applied Science, College of William and Mary, M. M. QAZILBASH, Department of Physics, College of William Mary — Spider silk exhibits remarkable mechanical properties, such as high tensile strength and toughness. We want to gain insight into the composition and structure of spider silk to discover the origin of these properties. We are especially interested in the organization of the crystalline beta sheets that are expected to contribute to the high strength of the silk from the recluse spider, *Loxosceles laeta*. The recluse spider produces a silk that has a unique geometry amongst arachnids. We measure the silk's optical properties, particularly the infrared-active and Raman-active vibrations. Broadband infrared transmission spectra were collected in the spectral range between 600 $cm^{-1}$ and 4000 $cm^{-1}$, with light polarized parallel and perpendicular to the long axis of the silk. Raman micro-spectroscopy was performed in the spectral range 500 $cm^{-1}$ and 4000 $cm^{-1}$ with a 514 nm laser. The infrared and Raman vibrational modes are fit with Lorentzian and pseudo-Voigt functions. The vibrational modes are assigned to specific structures and electronic bonds in the silk.

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Stephanie Wang
College of William and Mary

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