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Imaging and Laser Spectroscopy Investigation of Insect Wings TEGAN SHIVER, CARLOS LAWHEAD, JOSIAH ANDERSON, NATHAN COOPER, LASZLO UJJ, University of West Florida, PALL LIFE SCIENCES COLLABORATION — Measuring the surface morphology and chemical composition of insect wings is important to understand the extreme mechanical properties and the biophysical functionalities of the wings. We have measured the image of the membrane of the cicada (genus *Tibicen*) wing with the help of Scanning Electron Microscopy (SEM). The results confirm the existing periodic structure of the wing measured previously [1]. The SEM imaging can be used to measure the surface morphology of any insect species wings. The physical surface structure of the cicada wing is an example of a new class of biomaterials that can kill bacteria on contact [2]. In order to identify the chemical composition of the wing, we have measured the vibrational spectra of the wing's membrane (Raman and CARS). The measured spectra are consistent with the original assumption that the wing membrane is composed of protein, wax, and chitin [2]. The results of these studies can be used to make artificial materials in the future.

[1] Mark J. Tobin, et al. "High-spatial-resolution mapping of superhydrophobic cicada wing surface chemistry using infrared microspectroscopy and infrared imaging at two synchrotron beamlines" Journal of Synchrotron Radiation vol. 20 pp. 482-489 2013

[2] Sergey Pogodin, et al. "Biophysical Model of Bacterial Cell Interactions with Nanopatterned Cicada Wing Surfaces" Biophysical Journal vol. 104 pp. 835-840 2013

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