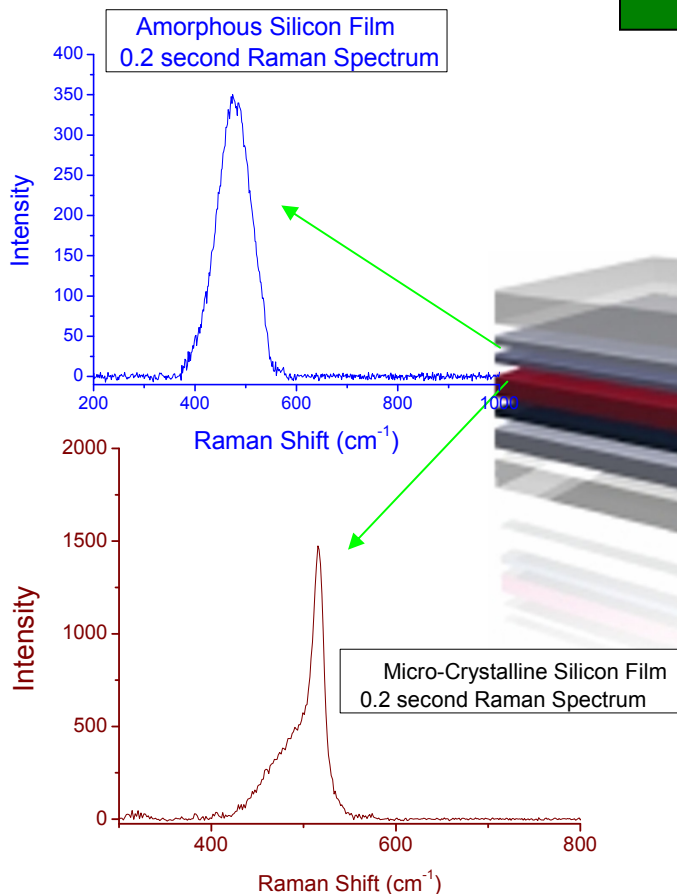
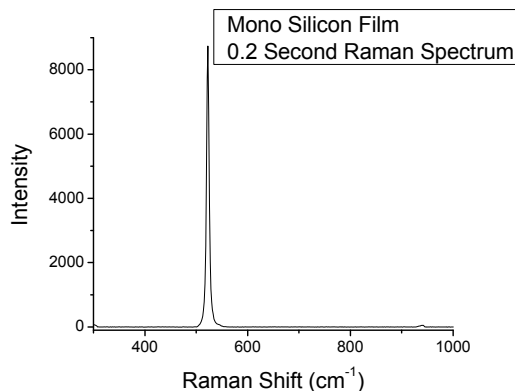


LAMBDA SOLUTIONS, THE COMPLETE SOLUTION FOR SILICON AND CARBON-BASED APPLICATIONS

SOLAR systems

THE NEW SILICON REVOLUTION *Powered by Lambda Solutions, Inc.*

The future of energy are systems based on non-combustive processes; no area holds more promise than photovoltaic solar cells. This technology is forging ahead creating greater photon/energy conversion based on band gap and charge transfer efficiencies across wider spectral ranges. The ability to create these arrays with high spatial integrity that combine amorphous, mono-crystalline and micro-crystalline silicon forms has become the challenge and the impetus to the PV revolution.



Lambda Solutions Inc. (LSI) is proud to be a partner to key players in the field of silicon film technology. Combining our patented high throughput signal fiber coupling, with our proprietary Raman Probe optic modules & state-of-the-art spectrometers, high speed thin film analysis by Raman becomes a reality. LSI's Raman spectrometer systems are unparalleled in sensitivity and flexibility, and optimized configurations and are available for a range of materials. Actual high speed spectra processed through LSI RamanSoft™'s patented background removal algorithm are shown here of amorphous mono- and micro- crystalline silicon with the **LSI Dimension-P1™-532** in an **amazing 200 milliseconds.**



*Lambda
Solutions, Inc.*

FEATURES OF DIMENSION-P1™-532

SOLAR systems

- Precision High Throughput Fiber optic probes with spot sizes from 10 μm to 1 mm to meet all power density and collection efficiency needs
- Up to 135 mW at 532 nm with a power density compatible with all forms of Silicon from amorphous to mono crystalline
- Robust Probe adaptor design with customizable mounting for easy placement at monitoring sites; Fiber systems of 100 meters or more
- High efficiency signal fiber arrays with patented fiber coupling for maximum light gathering and spectral resolution
- Customized spectral coverage from 40 cm^{-1} to 3800 cm^{-1} and resolution to 3 cm^{-1}
- Back Illuminated CCDs for maximal sensitivity in the visible spectrum
- Software control of all acquisition parameters and laser functions
- SDK, DLLs and support available for easy integration into host operating systems
- Top partners guarantee the highest quality components and customer support

To learn more about what Lambda Solutions' Fiber Probe Technologies can do for your thin film applications, call me at directly at 914 649 6181 or email me at vsapirstein@lambdasolutions.com

Victor S. Sapirstein, Ph.D
President, Lambda Solutions, Inc.

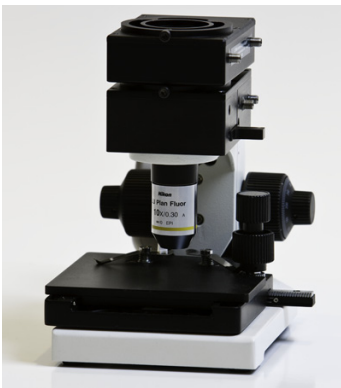


CARBON & GRAPHENE SYSTEMS

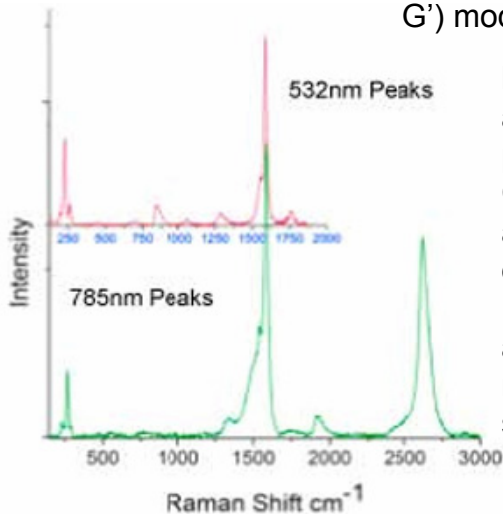
Carbon has joined Silicon as an integral material in both micro-electronics and energy technologies. The heat capacitance of carbon and the heat transfer and thermo-electric & conductive potential of carbon nanotubes make carbon-based structures part of the leading edge of nano-fabrication and micro-electronics. Because the diameter, chirality, length and lamellar structure of nanotubes are each determinants of functionality, the determination of these properties becomes critical to their efficient manufacture.

No less important is the revolution in micro/nano electronics afforded by new graphene transistor technology and its dependence on critical structural features. Raman spectroscopy is unique in its ability to interrogate these features and provide the critical information for QA/QC and process monitoring.

Lambda Solutions' family of Dimension-P1™ Raman spectrometers provide the sensitivity, resolution and wavelength flexibility to serve as **the** value added solution.

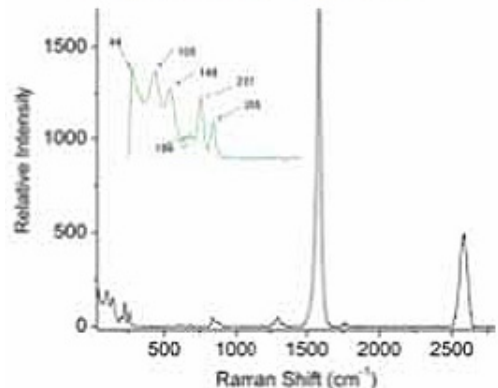


The MicroRaman Duplex Is LSI's unique dual wavelength Raman micro adaptor. Teamed with 532/785 nm Dimension-P2™, structural features can be rapidly obtained from radial breathing modes (RBM), disorder (D & D') and graphene (G & G') modes.



LSI's 40 cm^{-1} P1 systems allow for real exploration of phonon structures and large CNT diameters never before available in cost effective devices (above right). Our new Microadaptor technology allows clear analysis of multiwalled CNT growth on silicon substrates (below right).

Single-walled CNT's



Multi-walled CNT's On Si Substrate

