application note

Cobolt
High performance lasers

High performance lasers for Raman spectroscopy

Raman scattering

The "inelastic scattering of light", or Raman effect, was observed in practice for the first time in 1928 by C.V. Raman, who also won the Nobel Prize in 1930 for his find. Since then a whole discipline, Raman spectroscopy, was born and developed, giving excellent results in material analysis.

During the process of Raman spectroscopy, samples are first illuminated with a monochromatic light. Then, the scattered light is analyzed in order to collect information about the nature of the material, the chemical and physical properties.

Raman excitation sources

Due to the nature of the light they emit, lasers are ideal as excitation sources for Raman. Indeed, the laser light is intense, highly-collimated and monochromatic.

But not all laser lights are the same. There are some specific features that make some laser sources more suitable for Raman spectroscopy than others. These features are **high wavelength stability** and **high level of spectral purity**. Lasers with such characteristics are superior excitation sources, giving Raman graphs with better signal-to-noise ratio and more well-defined peaks.

DPSS lasers as Raman excitation sources

Traditionally, Raman researches have made use of ion gas lasers for measuring the Raman spectra. More recently excellent results have been obtained by using a more advanced and lower maintenance technology: diode pumped solid state (DPSS) lasers.

All Cobolt UV-visible lasers are continuous-wave (CW) diode-pumped solid-state lasers (DPSS) operating at fixed and precise wavelengths. The lasers are manufactured using the Cobolt´s proprietary HTCure™ Technology in a compact and hermetically sealed package, which provides a very high level of immunity to varying environmental conditions and ensures exceptional reliability and lifetime.

The Cobolt DPSS lasers qualify as excellent Raman excitation sources, thanks to their high wavelength stability (± 0.02 nm, typical 2 pm over ±2 °C and 8 hs) and high level of spectral purity (-60dB).

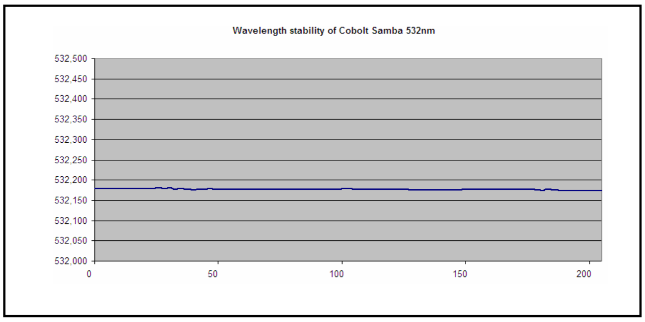

Figure 1: graph showing the long-term wavelength stability of A Cobolt Samba™ 532 nm

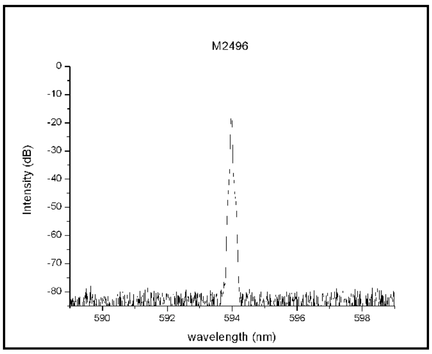

Figure 2: graph showing the spectral purity of a Cobolt Mambo™ 594 nm (actual linewidth, <1 MHz <0.01 pm)

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