

Method for stabilizing the Wavelength in a Laser Spectrometer System

Abstract

Provided is a novel method for wavelength stabilization in a laser spectrometer useful in spectroscopic measurement. According to the method, an initial scan is performed which comprises applying a current or voltage signal to a laser. In the scan, a current or voltage signal value is increased incrementally from a minimum signal value to a maximum signal value over a predetermined total number of signal values. The minimum and maximum signal values are selected such that an absorption feature of a species to be measured falls within the scan bounded by the minimum and the maximum signal values. The relative position of the absorption feature is determined with respect to the applied signal values in the previous scan by analysis of detector outputs corresponding to the signal values in the previous scan. An absorption value corresponding to the absorption feature is determined, and the concentration of the species to be measured can optionally be calculated. A new current or voltage signal scan is defined by resetting the signal values from the previous scan, so as to set the absorption feature in the new current or voltage scan in the same relative position with respect to the applied signal values as in the previous scan. An additional scan is performed, and the steps can be repeated until completion of the spectroscopic measurement. The inventive method allows for automatic correction and stabilization of wavelength in real time without the need for significant computation beyond what is typically required for determining the concentration of the species of interest from the spectroscopic data. Particular applicability is found in tunable diode laser absorption spectroscopy (TDLAS).

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