

Detection of the OH band fine structure in liquid water by means of new treatment procedure based on the statistics of the fractional moments

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Abstract

Three main spectral components ~ 3210 , 3450 , and 3650 cm^{-1} separated by deep gaps in the Raman OH band of liquid water have been detected by a new treatment procedure of experimental data. The applied treatment is based on the statistics of the fractional moments. This approach includes the consideration of the total set of the moments (the fractional and even complex ones) and the generalized mean value functions (GMV) as a specific noise "label". The possibility of the extraction and quantitative description of the fine structure of the averaging experimental spectra is demonstrated. In the frame of the novel approach the reliable separation between Raman spectra of the distilled and Milli-Q water is obtained. A graph is presented. The OH Raman band structure of a distilled (thin line) and Milli-Q (stars) water after the smoothing procedure and the first subtraction (first order) of an experimental spectrum. © 2007 by Astro Ltd. Published exclusively by Wiley-VCH Verlag GmbH & Co. KGaA.

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Keywords

OH band structure, Raman spectroscopy of water, Splitting of OH band, Statistics of the fractional moments