Thermal Field Mapping of 2-Dimensional Structures by Means of the Two-Laser Raman Thermometry Technique

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Over the last years, several techniques have been developed to measure the thermal conductivity of thin materials and nanostructures. Among these techniques, the ones that do not require previous preparation and are contactless have been the most attractive. Raman spectroscopy is one of the most powerful spectroscopic methodologies in the study of a great diversity of materials and its multiple uses are still being discovered. Two-Laser Raman Thermometry was developed by J. S. Reparaz et al., and consists of a novel technique to determine the thermal conductivity and thermal field mapping of one- and two- dimensional structures via the changes in their Raman shifts. It consists on inducing a thermal distribution of phonons in a sample using a heating laser and probing the temperature through the spectral position of Raman active mode. In this work the two-laser Raman Thermometry is used to study heat transport in the study of thin materials. Raman scans were performed not only by a line scan but by an area scan in order to have more detail of the thermal field, and the results show the characteristic thermal field previously reported. Thermal conductivity was determined using Fourier's law and is shown to agree with the values reported in the literature.