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Guest-Host Raman under Liquid Nitrogen Spectroscopy for the Acquisition of Improved Vibrational Spectra of Solids

Guest-host Raman under liquid nitrogen spectroscopy (GHRUNS) involves the isolation of solid-state guest molecules inside cage-like host environments for the facile acquisition of their Raman spectra. This convenient method features reduced fluorescence, the analysis of populations in their ground states, and increased signal to noise ratios. Samples are also preserved through the reduction of thermal degradation and oxidation. To demonstrate the benefits of this new method, Raman spectra of the ubiquitous molecule C_{60} inside a cage of water ice are presented. Using this technique, a new normal mode of C_{60} is elucidated. The GHRUNS methodology is of interest to those seeking to acquire and characterize the vibrational spectra, structure, and properties of emissive, air-sensitive molecules.

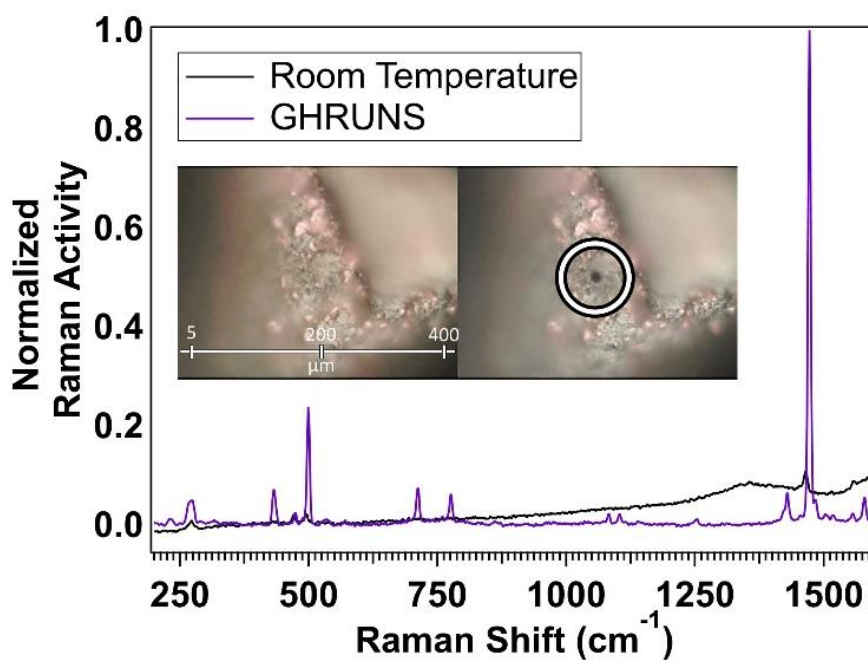


Figure 1: Raman spectrum of C_{60} at room temperature (black) and GHRUNS methodology (purple) under the same laser irradiation. The inset photograph demonstrates resulting laser damage at room temperature.