

VITREOUS SILICA UPON MECHANICAL LOADS AND LASER IRRADIATION: THE VIBRATIONAL MODES TREATMENT AND RAMAN ANALYSIS

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ABSTRACT

We perform a simulation of vitreous silica to explore the sensitivity to mechanical loads and laser irradiation, and, especially, an irreversible densification is considered. We rely on Raman spectroscopy, and we also present partial and total vibrational densities of states. To reveal the structure of the vibrational spectrum, the characteristics of vibrational modes in different frequency ranges are investigated using a mode-projection approach at different symmetries. We consider the main experimental bands, and relate them to a detailed description of the vibrations. Finally, we compare our Raman and VDOS spectra with experimental measurements.