

Raman Spectroscopy of Amorphous Carbon Films: State of the Art

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In the past decades, Raman spectroscopy has become a standard characterisation technique for any carbon systems: amorphous, nanostructured and diamond-like carbons, fullerenes, nanotubes, graphite, diamond and polymers. An enormous improvement in the theoretical and experimental understanding of these systems has been achieved. Here the present status in the understanding of the Raman spectra of amorphous and diamond-like carbons is reviewed. In particular, the application of resonant Raman spectroscopy to determine the structure and composition of carbon films with and without nitrogen is highlighted. Indeed, Raman scattering in carbons is always a resonant process, in which those configurations whose band gaps match the excitation energy are preferentially excited. Thus the measured spectra change with varying excitation energy. Using visible and UV excitation, the G peak dispersion can be derived and correlated with key parameters, such as density, sp^3 content, elastic constants and chemical composition.

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