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A scientific approach on the application of Raman effect on Raman spectroscopy to help in the detection of explosives

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Raman Spectroscopy, one of the most leading technology used to detect explosives uses a laser light source to irradiate a sample, and generates an infinitesimal amount of Raman scattered light, which is detected as a Raman spectrum using a CCD camera. To know about the working of Raman Spectroscopy, first the knowledge of Raman Effect is important. Light interacts with matter in different ways like refraction, absorption and reflection. Refracted light changes direction while absorbed photons disappear, giving off their energy to the absorbing material. During reflection light bounces off the surfaces of materials. If you think of light in terms of photons, reflection from surfaces is a type of scattering. The easiest way to explain Raman effect also known as Raman scattering is that photons sometimes tend to emit at a lower or higher energy than their incident state. When a photon is scattered from a molecule it is scattered elastically, i.e. they have the same frequency and wavelength as the incident photon. A very few percent of the photons scatter inelastically, i.e. they have different wavelength and frequency than the incident photon. The elastic scattering of photons is known as Rayleigh scattering and the inelastic scattering of photons is known as Raman scattering. To fully understand Raman scattering we have to know in detail about Heisenberg's energy – time uncertainty principle. And this paper we are going to discuss in detail how the Raman Effect is application in Raman Spectroscopy and how it helps in identifying explosives.

Biography

Sruthi Nair and Shelvin John are currently pursuing their Bachelor's degree in Forensic Science from Amity University, Noida, India.

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