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Educational Raman

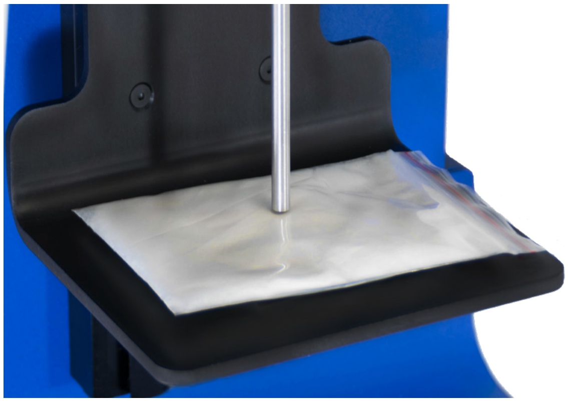
Raman In and Outside of the Lab

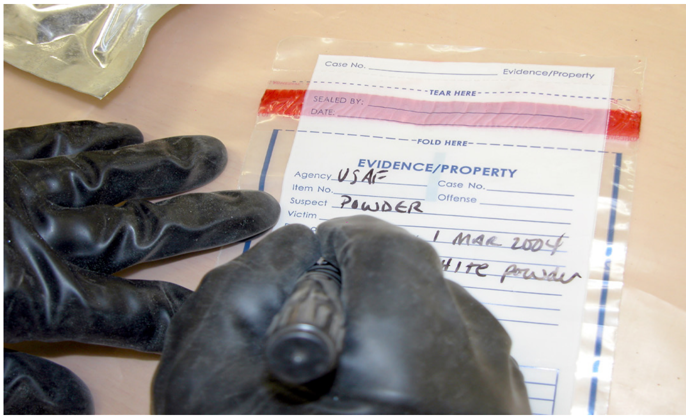
Raman spectroscopy can be used not only in laboratories to moinitor chemical composition, but also within the quality control process.

Raman spectroscopy is widely used within and outside of the lab. Inside, this technique can be used to identify key components and chemical concentrations present within a given sample. Outside, in-line quality control via Raman is quickly becoming an indispensable part of the manufacturing process.

In-line quality control determines the identity and concentration of the products developed or monitored throughout a given process. This assures that the material in question is consistently meeting the quality standards or criteria that has been set.

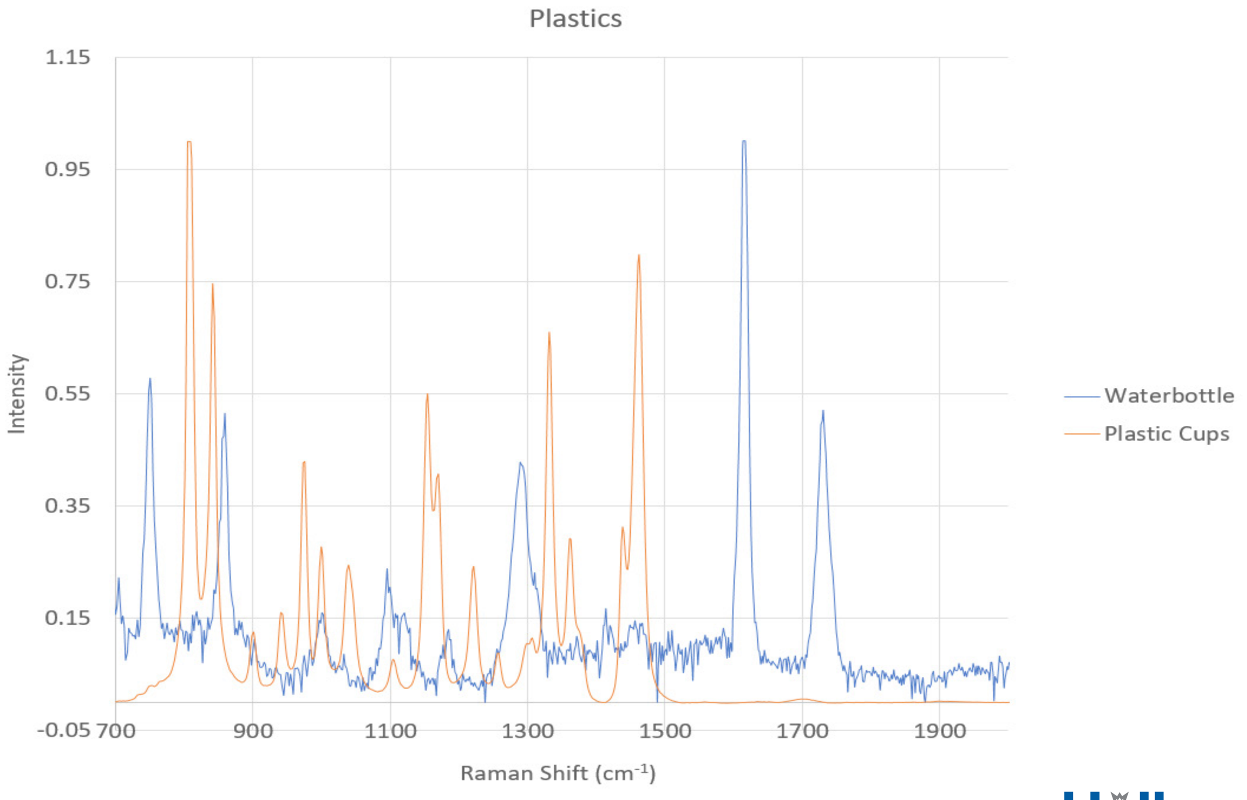
The pharmaceutical industry is one that make use of Raman both inside and outside of the lab. The formation of pharmaceuticals is a very complex, delicate process, so labs that test and create drugs often use Raman to verify that the correct chemical makeup has been achieved. In the lab, this technique can be used in the quality assurance and quality control processes, allowing for the continuous monitorization of drugs. This is done to assure that the tablets in each batch are uniform in their chemical composition.[1] Outside of the laboratory, its usefulness can be recognized through real-time customs and border protection. Portable Raman spectrometers can be used to rapidly identify controlled substances such as cocaine and heroin.[2]





This can be seen within forensics, as well. Raman's nondestructive nature allows for the quick analysis of samples within the lab. In order to detect forgeries, this technique is often used by scientists to compare samples of ink.[3] They also use it in order to detect gunshot residue and trace amounts of illegal substances. [4,5] Outside of the lab, Raman is particularly useful for on-scene endeavors. Unknown powders can be tested quickly and efficiently to determine if they are amphetamines.[6]

Raman spectroscopy is also useful in the formation and sorting of plastics. In-lab polymer development is an area where Raman can be used to monitor radical polymerization, specifically in emulsions, as Raman is almost entirely water insensitive.[7] Additionally, it can be used during in-process applications to monitor the state of polymer reactions. Outside of the lab, there has been promising discussion regarding the implementation of Raman in some recycling plants in order to identify and separate the different types of plastic.[8] This will assure that they get treated in the correct way.



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