Detection, Identification and Size distribution of micro-plastic particles

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Abstract

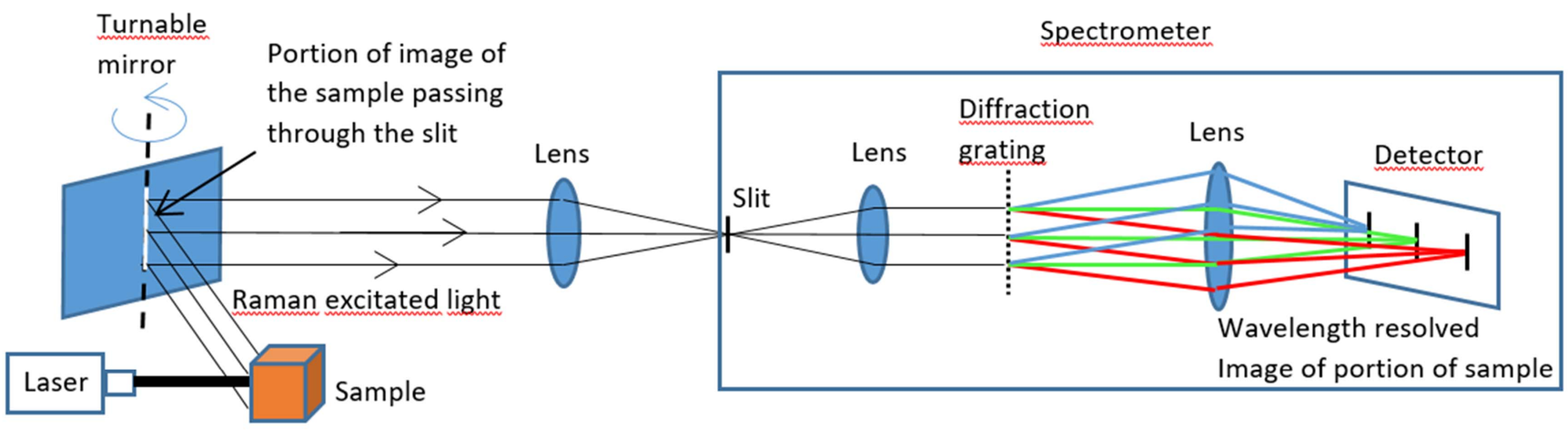
Pollution by micro-plastic in ecosystems is one of the major problems we are facing now, especially in marine environment. Many studies are going on the detection of different micro substances that pollute our environment. Micro-plastics are among the more frequent pollutants of the sort in aquatic ecosystems.

There have been some studies earlier on methodologies to detect and identify micro-plastic particles, in the order of one micrometer in environmental samples. Raman spectroscopy in combination with Raman spectral imaging is one of these methodologies. In theory, it is proven that the Raman spectral imaging can be used for the analysis of micro-plastic, but the applicability of this method has yet to be demonstrated.

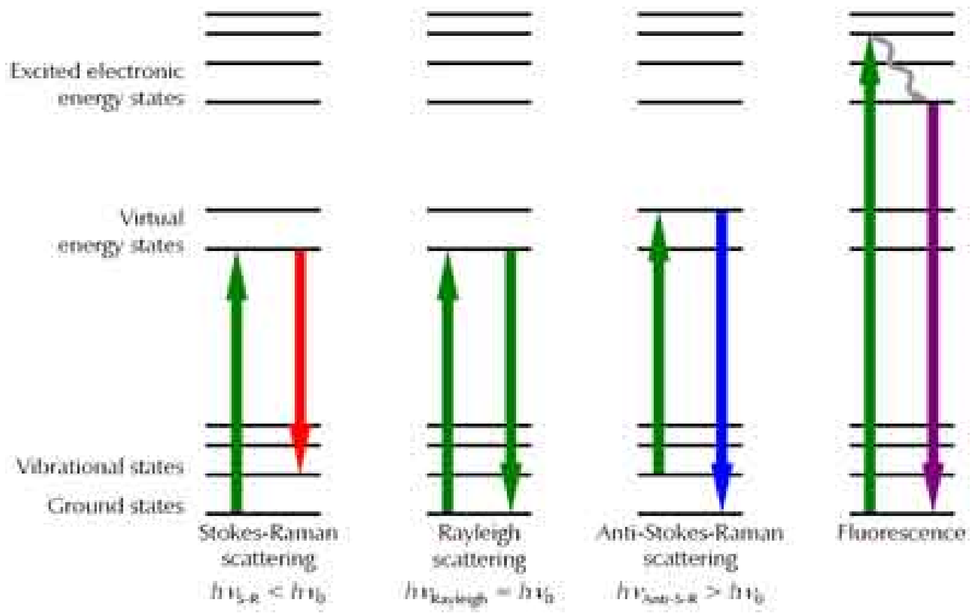
The aim of this project is to find the application of Raman microscopy in combination with Raman spectral imaging for the detection and identification of micro-plastic particles in ecosystems. In Raman spectroscopy, the sample often will produce unwanted fluorescence excited by the laser producing the Raman spectrum. Hence, more research is necessary to find the optimum laser wavelength for a compromise between suppressed fluorescence and low signal intensity for assessments of micro-plastics in environmental samples.

Proposed Experimental Methodology

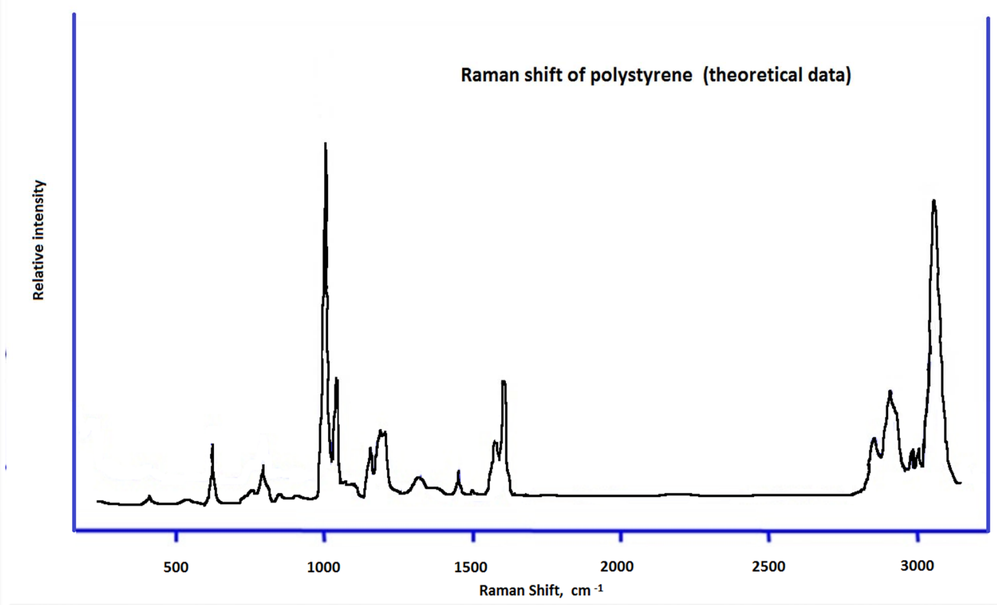
Principle behind Raman Spectral Imaging



Raman Spectroscopy



Raman shift



Conclusion

The proposed experimental methodology will help us to detect, identify and estimate the particle size distribution among the micro-plastic particles in the environment in general with the application of Raman microscopy in combination with Raman spectral imaging.

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