Drug discovery, Regenerative medicine, Food hygiene inspection

Development of simultaneous multi-point Raman spectroscopy system

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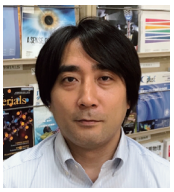


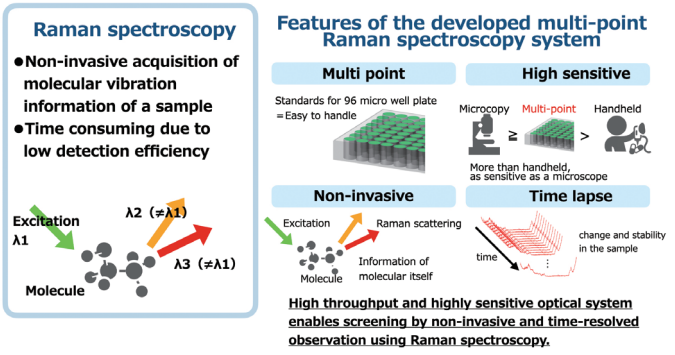
Abstract

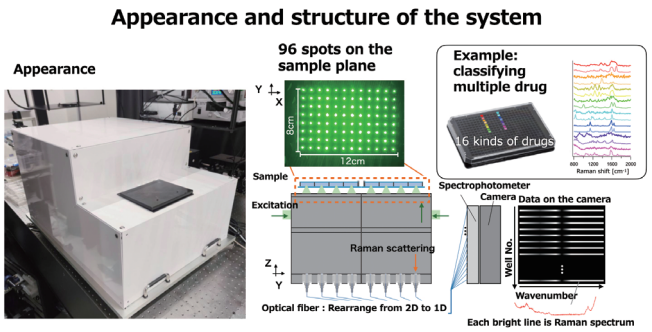
Since Raman scattered light reflects the wavelength shift derived from the sample molecular structure, which is different from the excitation wavelength, component analysis can be performed non-invasively. Therefore, Raman spectroscopy is expected to be utilized as one of the analytical techniques in various fields. However, since Raman scattered light is extremely weak (about 1/1,000,000 of excitation light), it generally requires several seconds or even several minutes per measurement point. If a large number of samples are to be analyzed, a very long time is required.

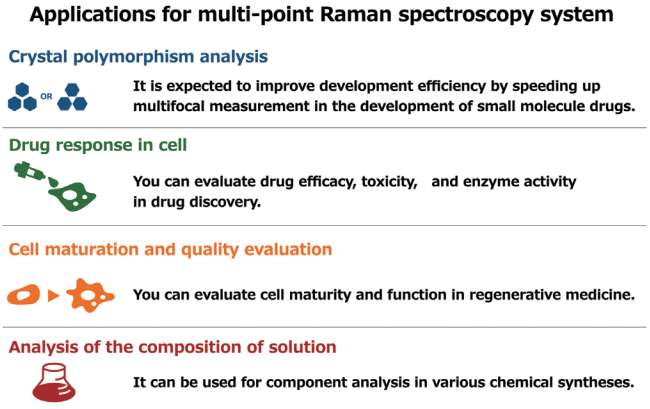
In this study, we propose a method of acquiring Raman spectra at multiple points simultaneously with high collection efficiency by our optical system, and aim to implement it as a device. We have developed a device for simultaneous spectral analysis of 96 samples on a commercially available 96-well microwell plate, and are developing applications.

Significance of the research and Future perspective

If the time required for Raman spectral analysis can be significantly reduced, a wide range of applications can be expected, including screening tests for pharmaceuticals and drug discovery, cell diagnosis in regenerative medicine, quality control in food production sites, and analysis of explosives in security. Therefore, the simultaneous detection of multiple points with the rich information of Raman spectra is valuable. We have already developed a prototype equipped with this technology, and are continuing to develop applications in pharmaceuticals and drug discovery, as well as further increasing the sensitivity.







Patent	Japanese Patent No. 622723 (Japanese Patent Application No. 2015-017431 (PCT/JP2016/052707))
Treatise	Kawagoe, Hiroyuki; Ando, Jun; Fujita, Katsumasa et al. Multiwell Raman plate reader for high-throughput biochemical screening. Sci. Rep. 2021; (11): 15742. doi: 10.1038/s41598-021-95139-8
URL	https://lasie.ap.eng.osaka-u.ac.jp/home_j.html
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