Molecular-selective Dynamics in Soft matter

Keywords: light scattering, spectroscopy, polymer physical properties

National Institute for Materials Science

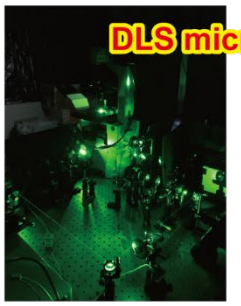
Back-ground

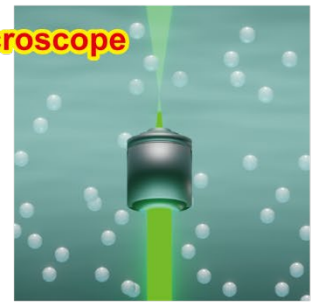
Dynamic light scattering (DLS) is a technique that has been widely used for the characterization of the diffusion dynamics for soft materials. One of the drawbacks of DLS is the absence of the molecular selectivity, which makes its application to multi-component materials such as biological cells very difficult.

Aim

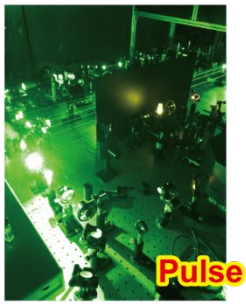
I propose the molecular-selective dynamic light scattering technique named dynamic Raman scattering. Molecular-selectivity is achieved by detecting the intensity fluctuation of Raman scattering signal from the sample. This new technique can be a powerful tool to monitor the dynamics in soft materials.

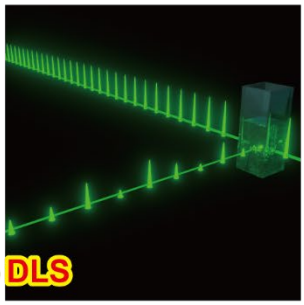
Advanced Research Topics

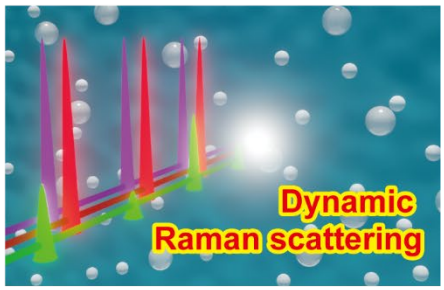


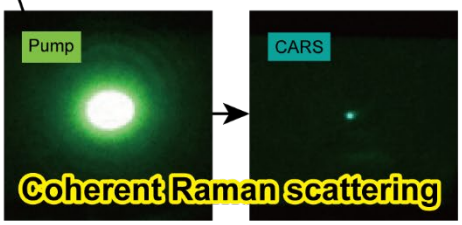


Key technology: One-and-only apparatus for dynamic light scattering (DLS)









Publications

- T. Hiroi et al., *Anal. Sci.* **2022**, *38*, 607-611.
- T. Hiroi et al., *Phys. Rev. A* **2021**, *104*, 062812.
- T. Hiroi et al., *Sci. Technol. Adv. Mater. Methods* **2021**, *1*, 134-142.

Summary

- Dynamic Raman scattering enables us to measure molecular-selective dynamics.
- Granted patents: 2021-092057, 2021-001363, 2020-188450.

Research outcome

- Dynamic Raman scattering can be a powerful tool to monitor the diffusion dynamics in soft materials, particularly biomaterials whose physical, chemical, and biological properties are dominated by diffusions.

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