# 遠心沈降法による凝集体のサイズおよび空隙率の測定

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Estimation of size and porosity of agglomerate by centrifugal sedimentation method ([1]*Department of Materials and Chemistry, National Institute of Advanced Industrial Science and Technology*) ○Yuichi Kato[1]

Agglomerates in liquids can be regarded as porous particles that contain a lot of solvent, unlike particles with packed spheres. Therefore, it is important to measure both size and particle porosity to characterize agglomerates. In this presentation, we discuss how to estimate the size and particle porosity by centrifugal sedimentation. We show sedimentation of carbon nanotube agglomerates as an example.

We found a phenomenon that the Stokes diameter of CNT agglomerates decreases as the rotational velocity (ω) increases (Figure) when they sediment in density gradient. This indicates that particle sedimentation can not be interpreted by the common Stokes equation. The Stokes diameter is not suitable for representing particle size distribution for CNT agglomerates. The Stokes diameter change can be explained by the buoyancy caused by the density difference between the inner fluid of the particle and the outer fluid (Figure). This buoyancy slows the particle sedimentation. This difference in density depends on the sedimentation velocity. The corrected sedimentation particle diameter and porosity can be estimated based on the equation which considers the buoyancy.[1]

Keywords : Centrifugal sedimentation; Particle size distribution; Interparticle porosity; Agglomerates; Density gradient

　液中の凝集体は球の詰まった粒子とは異なり、多くの溶媒を含んでいる多孔質な粒子とみなすことができます。そのため、凝集体の分析では、サイズだけでなく、サイズと粒子空隙率の両方の測定が重要です。本発表では、カーボンナノチューブの凝集体を例に、遠心沈降法によるサイズと粒子空隙率の推定方法について論じます。
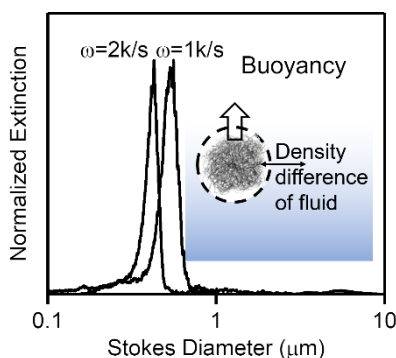
1) The single settling velocity equation of a spherical uniform porous particle in a linear density gradient without considering adsorption and convection has been reported. Y. Kato, T. Morimoto, K. Kobashi, T. Yamada, T. Okazaki, K. Hata, *J. Phys. Chem. C* **2019**, *123*, 21252-21256.