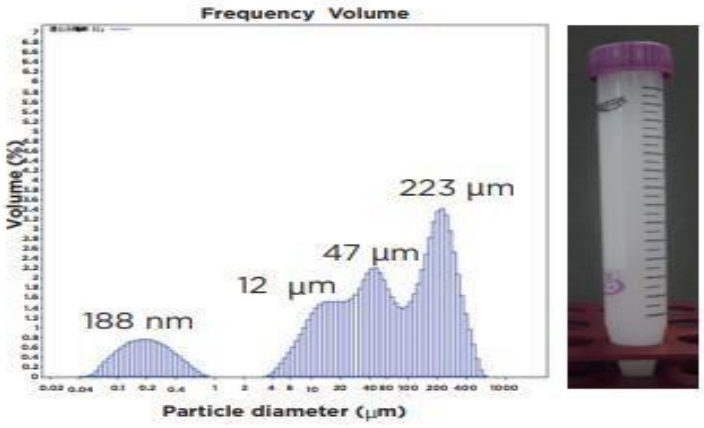
Grading of nanocellulose using a centrifuge

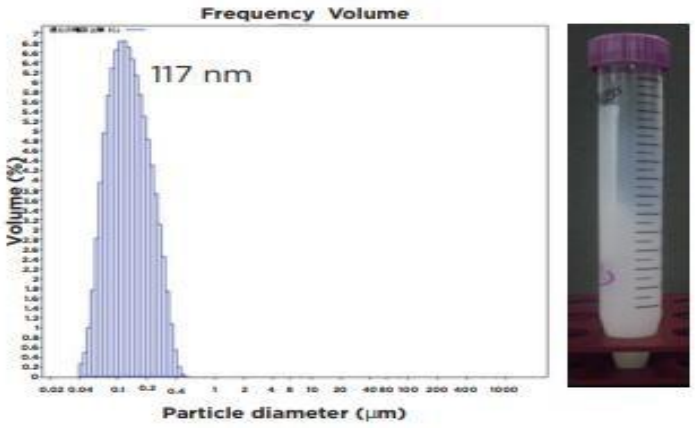
Nanocellulose is a nanomaterial that is garnering attention recently, and it is obtained from cellulose or a cellulose derivative through wet-type high-pressure dispersion and pulverisation or wet-type grinding and pulverisation. We will introduce the results of particle size measurements made using a Laser diffraction / scattering method particle size distribution measurement apparatus LS 13 320 XR to measure nanocellulose that was obtained by performing wet-type high-pressure dispersion and pulverization on low-substituted hydroxy propylcellulose, which is one type of cellulose derivative, as well as the results for separation of only the component to be measured in the nanosize region through centrifugation.

A Shin-Etsu Chemical Co., Ltd. L-HPC (low-substituted hydroxy propylcellulose) LODICEL LDC-H 2 wt% dispersion was passed through a Sugino Machine Ltd. Starburst test apparatus 10 times at a pressure of 150 MPa for use as the dispersion in the experiment.

Particle distribution prior to centrifugation



Particle distribution after centrifugation



The results obtained by measuring the nanoized dispersion using LS 13 320 XR are shown. At the same time as the detection of the nanosize particles generated as a result of the nanoization processing, we also detected microsize particles that remained without undergoing nanoization.
These results indicate that, even after nanoization processing, many particles remaining at the microsize will be present.
By using LS 13 320 XR, it will be possible to perform a quantitative comparative study by simultaneously measuring micro and nanosize particles

After using a high-speed refrigerated centrifuge (Avanti JXN-26) and a fixed angle rotor (JA-14.50) to centrifuge the material at 14,000 rpm (35,000 xg) for 1 hour, the supernatant was collected and the particle diameter was measured. As a result of

the centrifugation processing, it was possible to isolate and recover only the component consisting of the nanosize particles. The particles measured to be 188 nm prior to centrifugation were measured as 117 nm after centrifugation. This could be because, when there is polydispersion, the smaller particle diameter values will tend to approach the larger particle diameter values.