

Electrostatic and ultrasonic spraying of multiphase fluid for producing spherical granules

Toshiyuki Sugimoto¹, Masato Tanaka¹,

¹ Yamagata University, Japan

Abstract:

Spray granulation is often used for better handling of fine particles less than few microns. Spherical granules are produced by spraying multiphase fluid with the particles and water in a heated container and drying as it falls. A huge amount of heat power is required for the spray granulation.

We developed a new granulation system using electrostatic and ultrasonic forces without heat power. The multiphase fluid is sprayed by ultrasonic vibration of the fluid on the hydrophilic film and electrostatically transported to the surface of ultra-hydrophobic sheet on a collecting electrode (Fig. 1). Because the multiphase fluid droplets stay on the ultra-hydrophobic sheet without falling, the water in the droplets naturally evaporates and turns into spherical granules (about 10 – 20 minutes later). The diameters of the granules are measured using SiO₂ fine particles (Fig.2) by changing operating parameters such as applied voltage to the collecting electrode, distance between the hydrophilic film and the collecting electrode, spraying time and so on. It was found that the production rate and the diameter of the granules could be adjusted by changing these parameters.

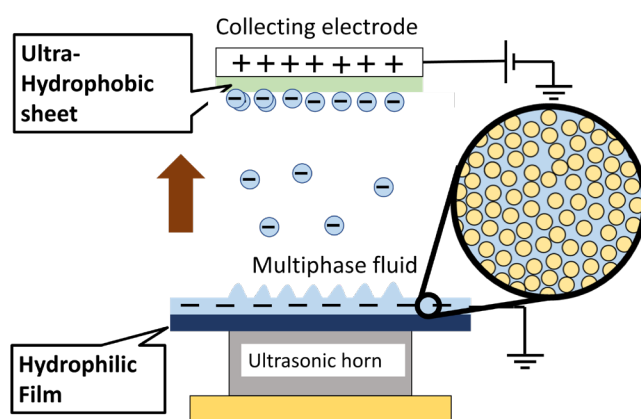


Fig. 1 A new granulation system.



Fig. 2 Granules with SiO₂ powder

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E-mail:

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Poster
Toshiyuki Sugimoto
toshi@yz.yamagata-u.ac.jp