

Device to measure nanoparticle distribution

Providing measurement technique that enables real-time observation of nanomaterial behavior

Overview

Recently, nanomaterials with innovative functionalities, such as nanofluids (nanoparticle/solvent mixture) and polymer nanocomposite materials (nanoparticle/polymer mixture), have been extensively investigated. These nanomaterials find diverse applications in fields including conductive nano-inks, solar cells, and sensors, and are frequently utilized as thin films. During the coating and thin-film formation processes of nanomaterials on substrates, a technique capable of precisely observing the liquid film shape and the behavior of the contained nanoparticles is essential.

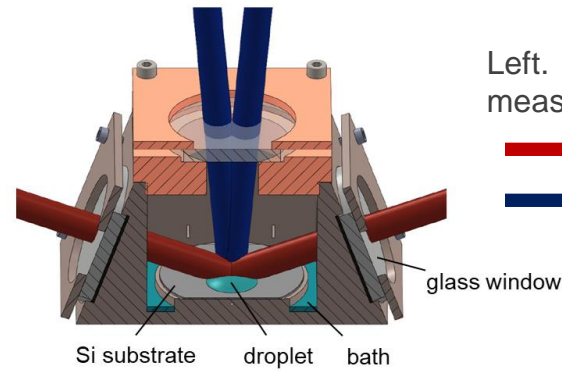
The present invention enables the simultaneous measurement of the liquid film shape, including nanofluids (nanoparticle/solvent mixture) and polymer nanocomposite coating solutions (nanoparticle/polymer/solvent mixture), as well as the distribution and concentration of nanoparticles within the liquid film. By integrating this device into a manufacturing line, process monitoring becomes feasible. Furthermore, a mathematical model has been successfully developed to comprehend the behavior of nanofluid droplets on a substrate. (See T24-027).

Product Application

- Measurement device for nanomaterial processes including nanoparticles
- Inspection equipment at manufacturing processes for batteries and printed electronics
- Nanofluid
- Polymer nanocomposite

IP Data

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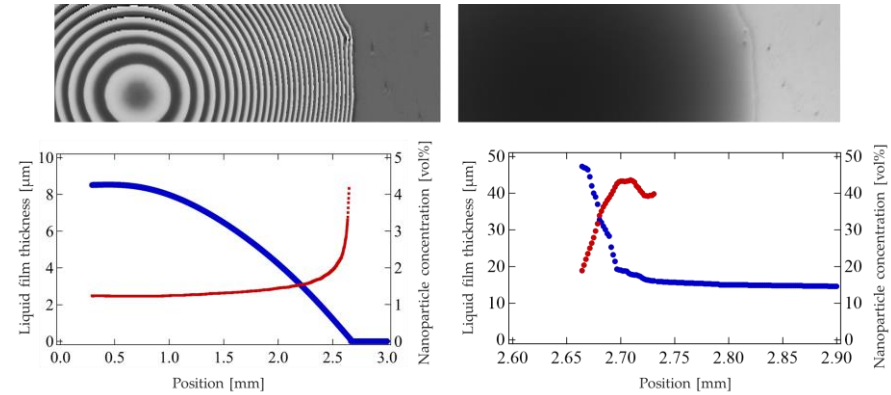


Left. Schematic diagram of measurement system

— Liquid film shape

— Nanoparticle concentration

Time-series observations



We succeeded in simultaneously measurement of liquid film shape with a thickness of nm to μm and the areal distribution of nanoparticle concentration.

Related Works

[1] EITA SHOJI, KEITA AIZAWA, TETSUSHI BIWA, 「Development of optical system to measure liquid film thickness and nanoparticle concentration of nanofluids on a substrate」, The 67th National Congress of Theoretical and Applied Mechanics, (2024).

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