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Development and optimization of Optical-fiber-based Reflectance Probe (ORP) for liquid-film thickness measurement[1] KAMPEI YAMAGUCHI, YUKI MIZUSHIMA, Shizuoka University — Liquid-film flow is frequently encountered in the industrial field and is directly related to product safety, efficiency, and yield. Researchers use the conductivity method for measuring liquid-film thickness. However, it is hard to realize sufficient resolution in a real machine due to environmental disturbances such as high-temperature, high-pressure, and so on. Therefore, we propose an Optical-fiber Reflectance Probe (ORP) as a liquid-film thickness measurement method for practical use. ORP is a non-contact method that estimates the distance from its tip to the gas-liquid interface (liquid film thickness L) by measuring the reflected light from the interface (Glare light). First, we examined the relationship between L and Glare light intensity I detected by the ORP, empirically. Second, we simulated the experiments with our original 3D Ray Tracing method. It suggests that the fiber-types determine the relationship between L and I. Finally, we will design some types of ORP for optimization according to target liquid-film thickness and flow condition.

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