

Surface Plasmon Resonance Imaging: Near-Field Visualization for Interfacial Phenomena

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Abstract

Surface Plasmon Resonance (SPR) is an exceptionally sensitive optical phenomenon that occurs at the interface between a metal and a dielectric medium. This phenomenon allows for precise detection of refractive index changes near the metal surface, making it a promising tool in biosensing, materials science, and interfacial studies. Surface Plasmon Resonance Imaging (SPRI) is a real-time and near-field visualization technique based on the principles of SPR. It has been utilized to analyze interfacial phenomena at the nanoscale, enhancing our understanding of phase change dynamics. SPRI can also offer new insights into practical applications across various fields, including thermal management, microfluidics, and surface engineering. This presentation introduces the fundamental concepts of SPRI technology and provides some visualization results concerning phase change phenomena, such as the evaporation of binary mixture droplets (BMDs), condensation, and frosting. In particular, it provides direct evidence of the time-invariant nature of the ultra-thin liquid layer near the contact line region during evaporation.

Keywords: Surface Plasmon Resonance Imaging, Near-Field Visualization, Phase Change, Interfacial Phenomena

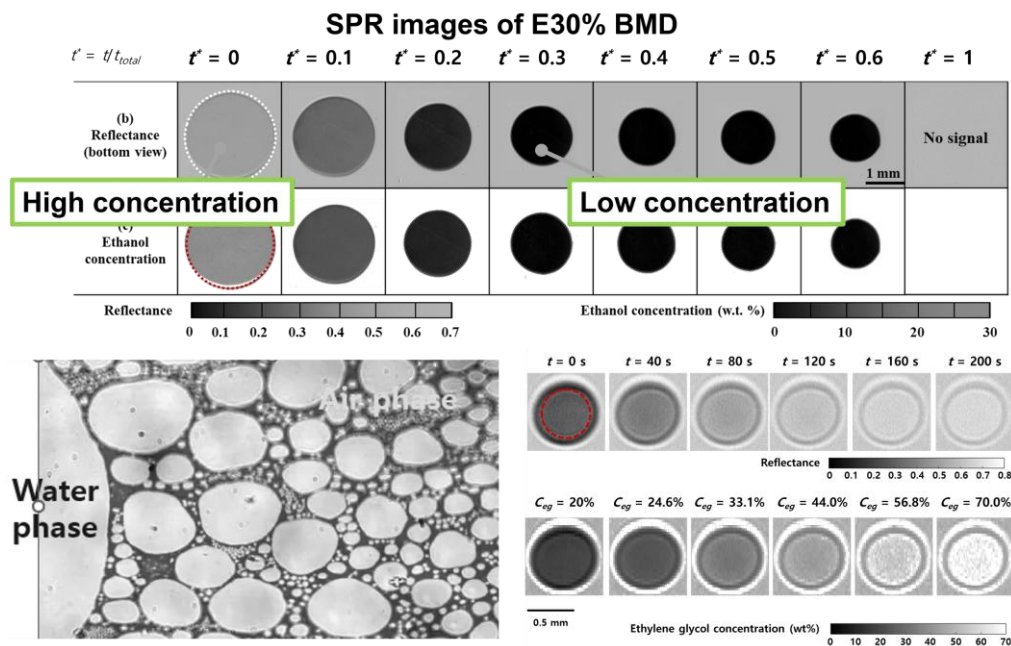


Figure 1. Surface Plasmon Resonance Imaging for Phase Change Phenomena.

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