

# **Toward Mass Production of Next-Gen Electronics: Several Issues in the High-Speed Fabrication of Coating Layers**

**Jaewook Nam**

*Department of Chemical and Biological Engineering, Seoul National University,  
Seoul 08826, Korea*

**ISCST- 20180917AM-AB-PL2**

Presented at the 19<sup>th</sup> International Coating Science and Technology Symposium,  
September 16-19, 2018, Long Beach, CA, USA<sup>†</sup>.

High-performance, multi-function, and flexibility are often requirements for next-generation electronics devices and systems, such as flexible display and energy harvest (or storage) devices. Key components of these devices are a film, typically a polymer or soft substrate that contains several superimposed layers made from electrically conducting, semiconducting, and insulating materials. Such layers can be deposited via various coating processes. Among them, continuous liquid coating process, a type of roll-to-roll process, is widely recognized as an attractive route to produce cost-effective, high-throughput and large-area coated layers. The coating liquid that contains various types of particles, additives (such as binder) and solvents may show complex rheological properties. The key issues in this process are how one can control flows inside macro-sized manufacturing machines to control microscopic features including thickness uniformity, microstructures of particles inside coated layers, etc. Physical or chemical phenomena behind such issues need to be understood in an engineering fundamental point of view. Such understanding could be useful in analysis and design of the process. For example, rheological properties of a coating liquid need to be taken into account in the analysis of complex film formation flow in various types of applicators, such as slot die, roll and spray. Also, an index or indicator for the microstructures needs to be developed to aid the design of the drying machine. In this presentation, some aspects of such coating and drying issues will be discussed, and several research attempts to tackle them will be presented.

---

<sup>†</sup> Unpublished. ISCST shall not be responsible for statements or opinions contained in papers or printed in its publications.