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Coating process for battery electrode

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Abstract:
For next-generation electronics systems and devices, such as flexible displays and energy harvesting (or storage) devices, high performance, versatility, and flexibility are frequently necessary. A film, which is often a polymer or soft substrate with numerous layers of electrically conductive, semiconducting, and insulating materials superimposed on it, is a key component of these devices. These layers can be created using a variety of coating techniques. The continuous liquid coating technique, a kind of roll-to-roll process, is one of them and is widely acknowledged as an appealing way to generate affordable, high-throughput, and large-area coated layers. The coating liquid may exhibit complex rheological characteristics if it contains a variety of particles, additives (such a binder), and solvents. The main challenges in this process are how to regulate flows inside large manufacturing equipment to regulate microscopic properties, such as thickness homogeneity, particle microstructures inside coated layers, etc. Such problems require an understanding of the physical or chemical phenomena underlying them from a fundamental engineering perspective. Such knowledge might be beneficial for the process' analysis and design. For instance, while analyzing complex film formation flow in various types of applicators, such as slot die, roll, and spray, the rheological characteristics of a coating liquid must be taken into consideration. To help with the design of the drying machine, a microstructures index or indication must also be created. In this talk, various research initiatives to address these coating difficulties, including flows inside pipe systems and coating machines, will be shown. Some elements of these coating issues will also be highlighted.

Bio: Jaewook Nam is an Associate Professor in the Department of Chemical and Biological Engineering at the Institute of Chemical Processes, Seoul National University in Korea. Dr. Nam performs creative research to understand microscale flow phenomena through experiment, theory, and computation to design a high-performance film production. He received his BSc in 2000, MSc in 2004; and his PhD from the University of Minnesota in 2009. He completed his postdoctoral research in the Department of Chemical and Biomolecular Engineering at Rice University.

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