

塗布技術研究会 第 72 回関東定例会

タイトル

【Drying colloidal films, from a liquid dispersion to a rigid coating】

発表者

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要旨

Colloidal dispersions are the basis of diverse types of coatings including paints, varnishes, foodstuffs, cosmetics and medical materials. These are prepared as complex mixtures of different phases of matter, such as nanoscopic particles, polymers and emulsions, dispersed in a liquid, applied to a surface and then dried. As they dry into a film, these materials also pass rapidly through intermediate states, like gels or glasses, which help determine the structure of the final product. Over the past twenty years there has been considerable research progress made in the understanding of these drying processes, for example including the search to replace more harmful solvents with water, or to prepare dispersions with bespoke, designer properties.

In this presentation I will walk through the key stages of how a dispersion dries. By identifying the processes that are active during the key stages of drying, I will show how we can understand and control how a drying film or coating solidifies. I will then turn to look at the properties of the solid product itself, and how drying can lead to mechanical instabilities like fracture, shear banding and peeling, and how such undesirable effects can be minimised.