

Stress development in suspension coating process

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This study explores the stress development of suspension coating film in coating and drying process. During and after solidification of coating film, the coating layer shrinks due to solvent evaporation. Constrained shrinkage after solidification due to adhesion to a rigid substrate evokes the stress development. The stress in the coating layer results in defects, such as peeling, cracking, curling and stretched pattern. In order to accomplish defect-free coating with proper drying condition, it is important to understand the evolution of stress development. Therefore, we developed the in-situ coating stress measurement apparatus using cantilever deflection method.

Some researchers have studied on stress evolution during suspension film formation. But little is known about the evolution during coating and drying process. In this study, we focused on how the stress, which is developed during coating process of high shear rate, has influenced on that of drying process. The coating materials were characterized by rheological measurement and they complemented our stress measurement results to figure out the stress development of coating and drying process.