

Drying of silica/PVA suspension: the effect of suspension microstructure

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Particle/polymer/solvent suspension system has complicated microstructure resulting from the interactions between particle-particle and particle-polymer interaction in addition to solvent contribution. When the suspension system is applied to coating and drying process, the system showed different rheological behaviour that suggests change in its microstructure. In this study, we investigated the microstructural change during drying of silica/polyvinyl alcohol (PVA) suspension. The amount of PVA adsorption on silica surface in silica/PVA suspension was controlled by adjusting suspension pH (1.5, 3, 6 and 9) and measured the smallest at pH 9 and increased with decreasing pH to pH 1.5. The suspension at pH 9 has the most dispersed microstructure and the degree of flocculation became stronger with decreasing pH. However, film microstructure after drying appeared porous and inhomogeneous at pH 9 and became close packed and dense with lowering pH. The effect of suspension structure on drying behavior and dried film property will be discussed with the evaluation of particle interaction in suspension.