

Hydrodynamics of binary particle mixture for PECVD in a circulating fluidized bed reactor

김국희, 박성희¹, 김상돈*
한국과학기술원; ¹우석대학교
(kimsd@kaist.ac.kr*)

Plasma Enhanced Chemical Vapor Deposition (PECVD) on fine powders in a Circulating Fluidized Bed (CFB) reactor has been developed for uniform vapor deposition. Fluidization of fine powders (Geldart's group C) in a CFB reactor has poor quality due to their strong adhesion forces among the powders. To improve solids circulation through the reactor loop, the binary particle mixture system was studied with coarse (Geldart's group A, Alumina, 85 μ m) and fine powders (Alumina, 3 μ m) in the reactor. Static pressure at different heights of the reactor was measured and a pressure balance diagram was constructed. To measure the solid circulation rate, two slide disk valves were installed inside the downcomer. The solids circulation rate can be controlled by proper adjustment of gas flow rate into the loop-seal. The solids circulation rate is proportional to the aeration rate into the loop-seal with solid holdup in the riser of 5.9161×10^{-7} at weight fraction of the fine powders of 0.03. This weight fraction is the optimum point to operate binary particle mixture system in the reactor.