

Modeling of Film Evaporator Focusing on the Vapor Phase Movement

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Film evaporator would be one of the wide-spread separation devices due to its simpler structure. It involves liquid film flowing down on the wall and separating agent of vapor phase flowing in countercurrent direction. Although superior operability, coming from its structural simplicity, as well as thermally stable separation are the main reasons of frequent use, there are sometimes additional various interior structures such as a wiper to supplement its poor mixing. In addition, most modeling and analysis of the device focused on the liquid side behavior because relatively intense mass transfer resistance was expected on the liquid phase for rapid dynamics of vapor. In this circumstance, rate based model of evaporator including first-principle equations is developed as a preliminary study for optimal design, and to examine the effect of vapor behavior on mass transfer arisen from structural variation.