

Dimethyl Carbonate Synthesis Process via Reactive Distillation and Pervaporation

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Dimethyl Carbonate(DMC) has been attracting increasing attention as a green chemical material due to its wide application in chemical and petrochemical industries. DMC is used as a precursor in polycarbonate production and can be used in other fields such as medicine, pesticide, and solvent. DMC is produced by transesterification of ethylene carbonate(EC) with methanol(MeOH). In the case of equilibrium controlled reactions such as transesterification limited by chemical equilibrium, reactive distillation(RD) is a promising process alternative. The conventional methods (crystallization, high-pressure distillation, extractive distillation, and adsorption) have some disadvantages such as high capital investment, operating costs and energy consumption. In this study, we proposed combination of RD with pervaporation, an effective separation process for azeotropic mixtures. The process has less environmental pollution, lower energy demands and no vapor-liquid equilibrium limitation. We also studied effect of various operating parameters, such as pressure difference of membrane, the mole fraction of MeOH in the retentate stream, and flow rate of recycle stream on the process efficiency.