Azoetropic Distillation of Acetonitrile and Propanol Using Dividing Wall Column Technique

Acetonitrile and n-propanol are the important organic com-pounds in the pharmaceutical and fine chemicals industry. Acetonitrile and n-propanol are often used as mobile phase in liquid chromatography. Industrial production produce lots of acetonitrile/n-propanol mixture, which may cause the serious problems of environmental pollution if the mixture is direct, discharged. Since acetonitrile and n-propanol form a binary minimum boiling homogeneous azoetrope, conventional distillation methods cannot achieve this separation effectively. Hence, other types of distillation methods are necessary for this separation. Extractive dividing wall column and the pressure swing distillation have been discussed, but the literature on the separation of acetonitrile/n-propanol mixture via dividing wall column method is rather limited. Hence the process is developed using the extractive dividing wall column and the pressure swing distillation for separating acetonitrile/n-propanol system.

Pressure swing distillation is composed by low pressure column (LPC) and high pressure column (HPC). To ensure the temperature differences between utilities and the steam in the condenser and re-boiler are larger than 20 C, the pressure of LPC is set as atmospheric, the pressure of HPC is set as 7 atm. The simulation is carried out based on the above mentioned methodology and operating conditions.