#### *11.4.1.12 Sulzer Multiblok Suspension Melt Crystallizer*

The Sulzer company developed the multiblok suspension melt crystallizer using a modular design concept with identical segments stacked on top of each other. The segments are either scraper ones, which prevent rapid crystal layer build-up and allow for higher loads, or mixer ones which effectively support radial and axial mixing. All the elements are mounted on one central shaft in the crystallizer. Modular design with standardized segments can increase the flexibility and plant capacity of the assembly with optimal engineering and fabrication costs.

#### *11.4.1.13 Other Suspension Melt Crystallizers*

Wang *et al.*[36] proposed a new multistage countercurrent melt crystallizer with sieve plates which combines the advantages of the TNO purifier and the inclined column crystallizer. Similar to normal column crystallizers, a stirrer with scrapers is used to prevent encrustation on the column walls and to enhance countercurrent contact between the crystals and reflux melts. Also, the crystallizer consists of three sections: crystallization, purification and melting. The modification includes several sieve plates fixed on the shaft to enhance heat and mass transfer, as well as crystal breakage in the purification section. However, unlike the TNO column, the sieves do not have balls on the trays. Besides, the sieves are inclined to facilitate the settlement of solid particles which includes the advantages of inclined column. Therefore, this new column crystallizer has better mass and heat transfer effects and can solve problems associated with solid particle sedimentation.

Zhong *et al.*[37] developed a melt crystallization process for the separation of *p*-xylene. After the slurry is formed using suspension crystallization, it is fed into a filtration and purification unit to obtain mother liquor, washing residue and pure *p*-xylene. The filtration and purification process could be accomplished by using a simulated moving bed or a combination of multiple moving beds to implement continuous feeding and discharging. The simulated moving bed implements functions of filtration, washing and melting by switching streams *via* a rotary valve, while the combination of multiple moving beds rotates the moving beds to switch streams. The application of melt crystallization and simulated moving beds or moving beds helps to lower the capital costs and make the operation easier for the separation of *p*-xylene.

### 11.4.2 Solid Layer Crystallization

An endless moving conveyer belt or rotating drum could provide the cooled surface for layer melt crystallization techniques continuously. Therefore, the normal falling film crystallization concept could be applied and modified to realize continuous operation. This section presents the continuous solid