Effect of Cooling Profile on Purification of NVP(n-Vinyl-2-pyrrolidinoe) using Plate-type Layered Melt Crystallizer

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For the purification of organic compounds, melt crystallization near melting point can be used to obtain ultra-high purity products. The cooling strategy is one of the important factors for the design and operation of melt crystallizers. Crystals are formed on the cooling surface and it acts as the barrier to heat transfer. To find the optimum strategy for product purity and production rate, cooling profiles were varied and their effects were observed. The cooling rate was varied from 0.08℃/min to 0.13℃/min and several profiles were applied. After the crystallization step, all samples were sweated at the same condition (30 minutes at 16.5℃) and the purities of products were analyzed by GC. Amount of product crystals and remaining solutions were compared for the analysis of productivity. Simple heat transfer model was applied and parameters were found for the design and operation of industrial scale crystallizers.