

# MELT CRYSTALLIZATION TECHNOLOGY AND EQUIPMENT

ECO-FRIENDLY  
HIGH-PURITY

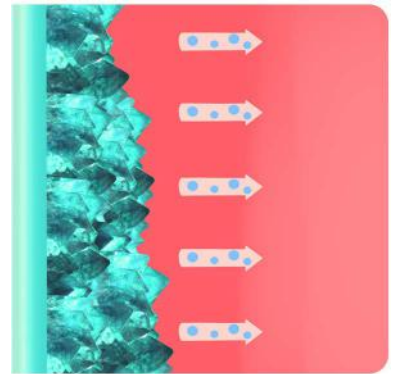
# Principle of Melt Crystallization

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The driving force of the melt crystallization process is the supersaturation or undercooling of a component in the molten liquid, the process is divided into three stages: crystallization, sweating and melting.

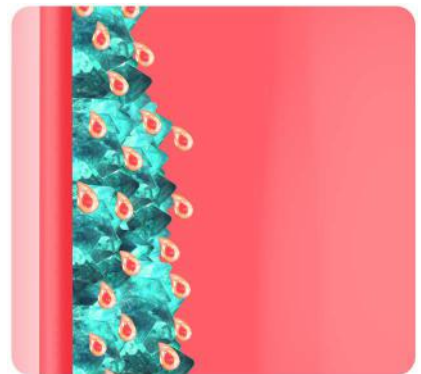
Crystallization is the process in which, as the temperature of the molten liquid is gradually decreased, a component in the melt becomes supersaturated and begins to nucleate and grow into crystals.

## •Crystallization



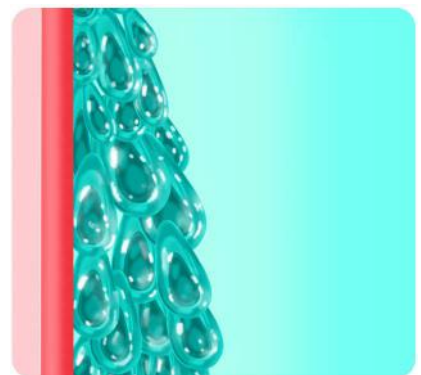
During the growing process of crystal, impurities of mother liquor will inevitably be trapped in the coarse crystal, so the coarse crystal needs to undergo the sweating process for purification.

## •Sweating



The purified crystals are melted completely by heating.

## •Melting





## DODGEN Melt Crystallization

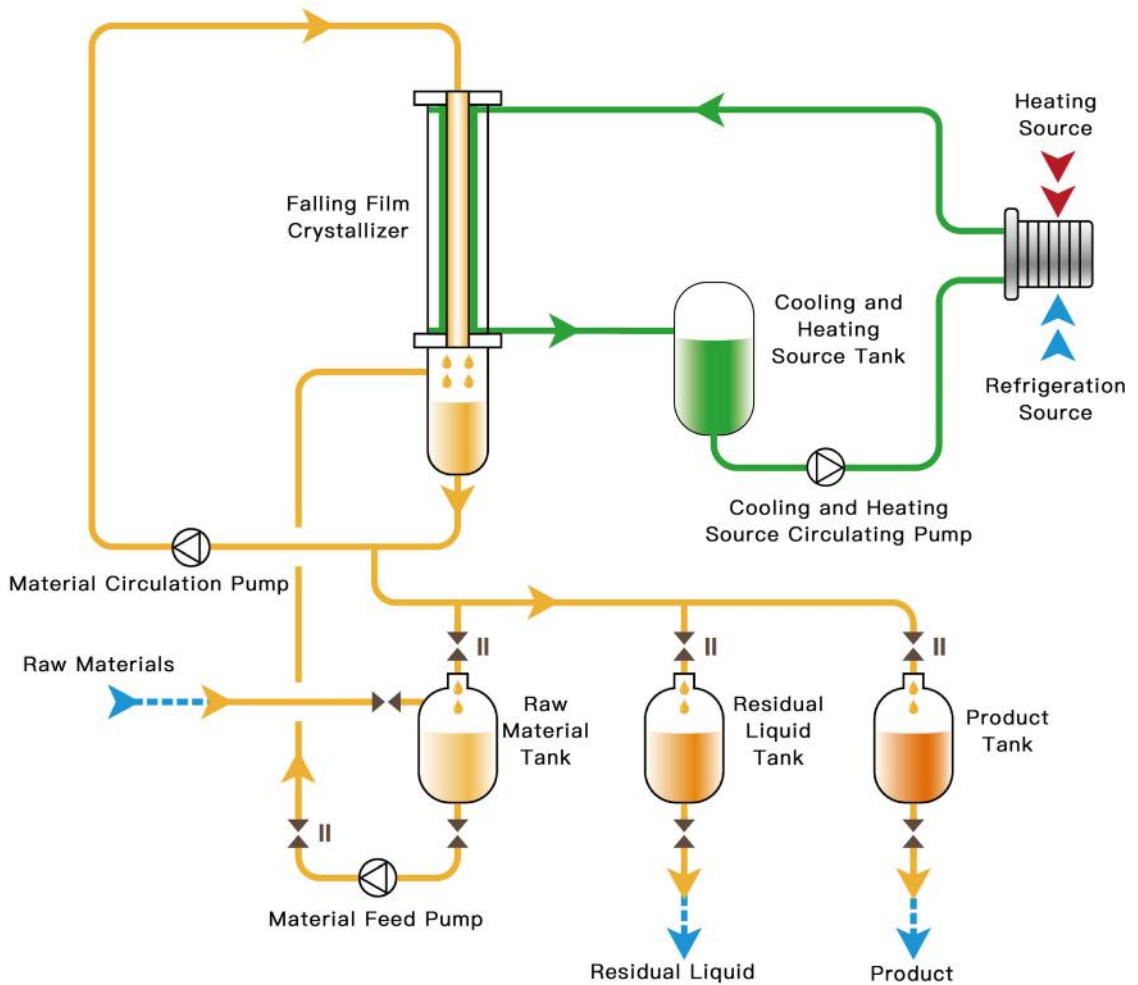
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DODGEN is an outstanding player in the field of melt crystallization technology. We improve separation efficiency by enhancing the coupling of cutting-edge melt crystallization separation technology with other separation technologies. Additionally, we have developed a unique melt crystallizer to adapt to the separation of specific substances.





## Dynamic Crystallization Flow Diagram





## Advantages of Melt Crystallization

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The melt crystallization technique offers many advantages:



### High product purity

The product purity can be above 99.99% chromatographically pure.



### Low operation requirements

Generally, it is operated at atmospheric pressure and low temperature, with simple and safe operation.



### Applicable special material system

It is very difficult to separate isomers and chiral substances by distillation, while separation can be easily achieved by melt crystallization.



### No solvent required

The crystallization process does not require the addition of other solvents, which can avoid the increase of impurities and environmental pollution.



### Investment saving

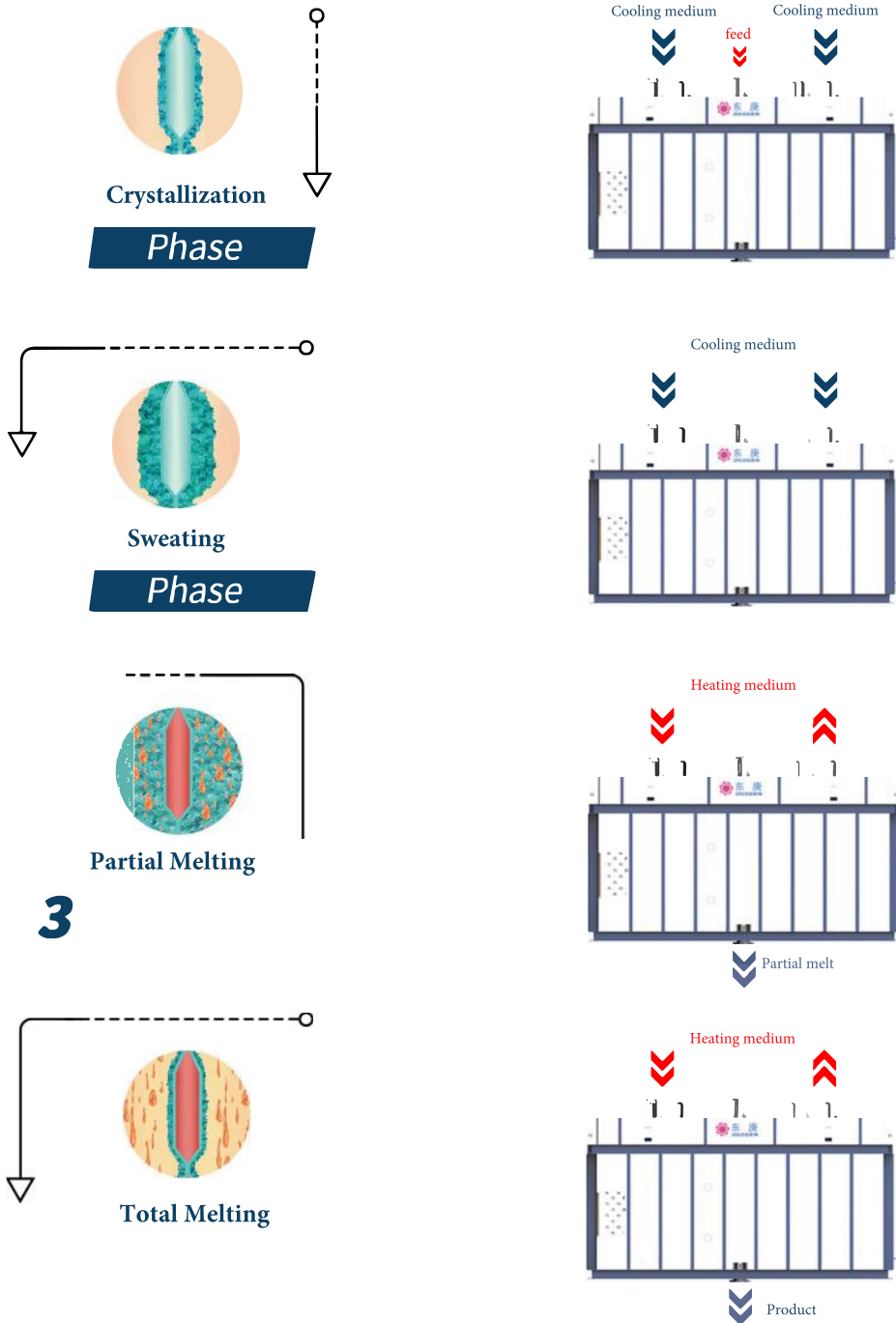
There are no excessive requirements for equipment, which can reduce costs and equipment investment.



### Energy conservation and environmentally friendly

The energy consumption of melt crystallization is generally only 10%-30% of that of distillation.

# Static Melt Crystallization Process



## FFC Multistage Recrystallization Process

Multi-stage fractional recrystallization is a necessary process for falling film melt crystallization to achieve ideal purification effect. The way the feedstock is produced in the segments depends on the desired product purity and yield.

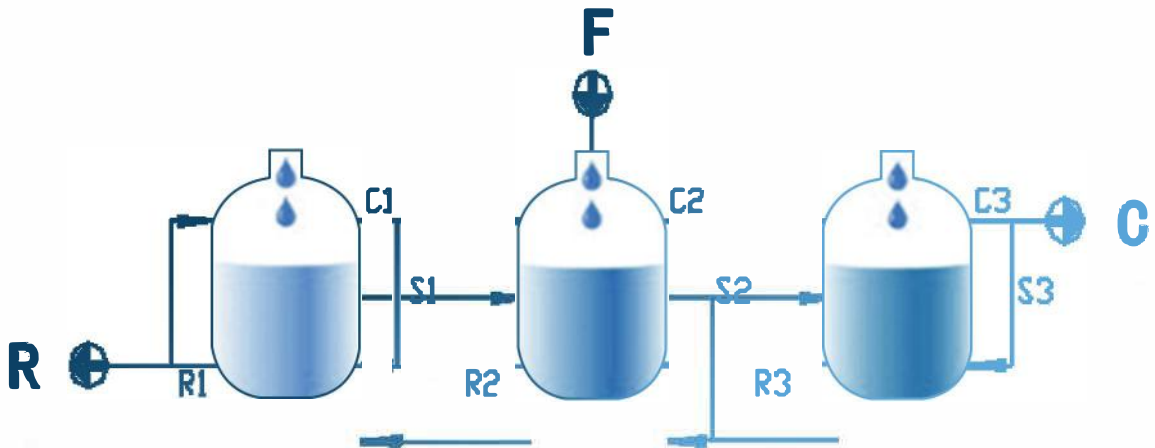


FIGURE: Schematic diagram of a typical 2+1 multi-stage segment recrystallisation

DODGEN falling film crystallization technology has the characteristics of large crystallization area, high processing capacity and high crystallization efficiency. A single set can handle more than tens of thousands of tons of materials, and PLC fully automated control can achieve the effect of a fully continuous process, with online real-time data and self-learning optimization process.



# Preferred Conditions for Melt Crystallisation

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## Bottleneck in distillation process

- The substances are easily decomposed by heat.
- The substance polymerization causes serious operational problems.
- The boiling points are very similar and the energy consumption of distillation is high.
- The number of theoretical plates required for distillation is high.

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## Special group substances

- Substitution of benzene
- Hydroxy acids
- Fused ring compound
- Phenyl alkanes, phenyl ketones, etc.
- Diamine, dinitrile, diisocyanate

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## Freezing point in the range of 20-200°C

- More than 70% of the substance has a freezing point of 20-200 °C and requires low public works consumption.

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## Obtain high purity chemicals

- The product requires purity greater than 99%.
- The Crystallization meets the requirements of food grade, polymer grade and electronic grade.



# Typical Applications of Melt Crystallization

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## Petrochemical industry

| 1,2,4,5-Tetramethylbenzene, Maleicanhydride, P-xylene, M-xylene



## Polymer monomers

| Bisphenol A, Acrylic acid, Caprolactam, Dimethyl terephthalate, Hexanediamine



## Electronic chemicals

| Ethylene carbonate, Dimethyl carbonate, Vinylene carbonate, Hydrogen peroxide, Phosphoric acid



## Biosynthetic materials

| Dimethyl succinate, Lactide, Pentanediamine, Long-chain dibasic acid



## Coal chemical industry

| Refined naphthalene, Fischer-Tropsch wax, Cresol, Naphthol



## Fine Chemicals

| Benzoic acid, Phenylenediamine, Dichlorobenzene, Chloroacetic acid, Nitro chlorobenzene



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