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冰晶尺寸及其对微波辅助冷冻干燥的影响

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摘要 Freeze drying of an aqueous solution would result in the non-uniform distribution of solute concentration.Because ice is almost transparent to microwave, therefore such a non-uniform distribution may affect the microwave assisted freeze drying. The direct observation of the ice crystals formed under microscope reveals that the ice crystal sizes formed from de-ionized water depend on the cooling rate with fast cooling rate giving smaller ice crystals as expected. Once there is a sufficient amount of solute mixed with the de-ionized water, for example the reactive red,the size and its distribution are not very much dependent on either cooling rate or the final temperature provided there is sufficient time of cooling and the final temperature is not too
low. The size of ice crystals formed within the solution of reactive red is usually below 100μm with a freezing rate of 1℃·min^-1 for a droplet of the size of less than 1 mm. A simplified simulation indicates that such a small ice crystal would not cause a significant non-uniform distribution of temperature for microwave assisted freeze drying. When the ice crystal size is larger than 5 mm, heat conduction from the solute concentrated region to the ice region mav need to be considered.

关键词

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Ice Crystal Sizes and Their Impact on Microwave Assisted Freeze Drying

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Key words

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