

A NEW TECHNOLOGY FOR THE CRYSTALLIZATION OF DEAD SEA POTASSIUM CHLORIDE

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Abstract:

The aim of this article is to introduce a new technology for the production of Dead Sea potassium chloride. The new technology depends on using the power of ultrasound waves during a crystallization process to enhance potassium chloride precipitation and to improve the end-use properties of the produced crystals. This environmentally clean technology, which is called sonocrystallization, has received very intensive research in the past few years. It was used in this study to modify the crystallization process of potassium chloride from the decomposition of Dead Sea carnallite. Two crystallization runs were done; the first was performed without the application of ultrasound waves and the second was performed with this application. The effect of sonication on the crystallization process time and on crystal size distribution as well as on the purity of the crystals was studied. It was found that the required time for the un-sonicated process was about 150 min. This time was reduced to about 50 min when sonication was applied. The produced crystals were sieved, and the crystal size distribution (CSD) was determined for the two runs. For the sonicated process, finer but more uniform crystals were obtained with a mean average size of 0.2643 mm in comparison with 0.5727 mm for the un-sonicated process. The produced crystals were found to be of 96.07% KCl for the un-sonicated process and this purity was improved to 97.31% KCl by the application of ultrasound waves. Based on the results of this study, it seems to be feasible and economical to scale up the proposed technology for industrial applications.

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Advantages of Prof.Mansour's New Technology compared to traditional crystallization process:

- 1-New process is very fast and it saves 67% of the process time.**
- 2-New process gives uniform and smaller crystal size which makes the process of change into fertilizer much more efficient.**
- 3-New process gives uniform size distribution**
- 4-New process gives more crystals purity which leads to higher quality and higher price.**
- 5-New process is performed at room temperature and there is no need for heating.**
- 6-New process is more economic and products sell better with higher price.**
- 7- Scaling -up of the new process is easy since it is performed at room temperature and atmospheric pressure.**

From Bench Scale to Commercial Scale:

Scaling -up of the new process is very simple since it is performed at room temperature and atmospheric pressure.

All that is needed is to use our new effective modified ultrasonic devices which will give much more better results .