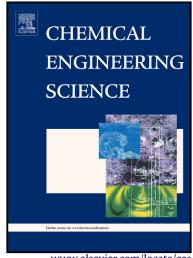
### Author's Accepted Manuscript

Lithium bromide crystallization in water APPLIED TO AN INTER-SEASONAL HEAT STORAGE PROCESS

E. Lefebvre, L. Fan, E. Gagnière, S. Bennici, A. Auroux, D. Mangin



www.elsevier.com/locate/ces

PII: S0009-2509(15)00154-2

DOI: http://dx.doi.org/10.1016/j.ces.2015.02.039

Reference: **CES12200** 

To appear in: Chemical Engineering Science

Received date: 1 September 2014 Revised date: 6 February 2015 Accepted date: 24 February 2015

Cite this article as: E. Lefebvre, L. Fan, E. Gagnière, S. Bennici, A. Auroux, D. Mangin, Lithium bromide crystallization in water applied to an inter-seasonal heat STORAGE PROCESS, Chemical Engineering Science, http://dx.doi.org/10.1016/j. ces.2015.02.039

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

#### ACCEPTED MANUSCRIPT

# LITHIUM BROMIDE CRYSTALLIZATION IN WATER APPLIED TO AN INTER-SEASONAL HEAT STORAGE PROCESS

E. Lefebvre<sup>1, 2\*</sup>, L.Fan<sup>1</sup>, E. Gagnière<sup>1</sup>, S. Bennict<sup>2</sup>, A. Auroux<sup>2</sup>, D. Mangin<sup>1</sup>

<sup>1</sup> Université de Lyon 1, CNRS, UMR 5007, LAGEP, Laboratoire d'automatique et de génie des procédés, CPE Lyon, 43 boulevard du 11 Novembre 1918, 69100 Villeurbanne, France

<sup>2</sup> Université de Lyon 1, CNRS, UMR 5256, IRCELYON, Institut de recherches sur la catalyse et l'environnement de Lyon, 2 avenue Albert Einstein, F-69626 Villeurbanne, France

\* To whom correspondence should be addressed. E-mail: <a href="mailto:lefebvre@lagep.univ-lyon1.fr">lefebvre@lagep.univ-lyon1.fr</a>

Keywords: lithium bromide, solubility in water, nucleation, crystallization, metastable zone.

#### **Abstract**

This work is part of a larger study dedicated to an inter-seasonal heat storage process based on novel absorption pump operated in two half-cycles that uses LiBr/H<sub>2</sub>O as the absorbent/absorbate couple. The solar energy is stored during summer through desorption, and the heat is released during winter through absorption. A characteristic of the device is that crystallization occurs in the storage tank as its temperature falls under 10°C at the end of summer or in winter. Thus, information on the degree of hydration of the crystals at low temperature is required to optimize the storage density. This paper aims to precisely determine the behavior of LiBr in terms of crystallization. In this study, solubility and metastable zone limit curves were assessed using an agitated and thermostated batch crystallizer. A video sensor was employed for assessment of the crystals morphology and thus, the hydrated crystalline forms present inside. The transition temperature between lithium bromide dihydrate and trihydrate was found to be equal to 3.0°C. The dissolution and crystallization enthalpies were also calculated using the Van't Hoff plot, and results were found to be in good agreement with the literature data.

#### Download English Version:

## https://daneshyari.com/en/article/6589850

Download Persian Version:

https://daneshyari.com/article/6589850

<u>Daneshyari.com</u>