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PII: S0022-0248(16)00027-0
DOI: <http://dx.doi.org/10.1016/j.jcrysgr.2016.01.006>
Reference: CRY23153

To appear in: *Journal of Crystal Growth*

Received date: 30 November 2015
Revised date: 7 January 2016
Accepted date: 8 January 2016

Cite this article as: Vadim M. Kovrugin, Marie Colmont, Oleg I. Siidra, Vladislav V. Gurzhiy, Sergey V. Krivovichev and Mentre Olivier Mentré, Pathways for synthesis of new selenium-containing oxo-compounds: chemical vapor transport reactions, hydrothermal techniques and evaporation method *Journal of Crystal Growth*, <http://dx.doi.org/10.1016/j.jcrysgr.2016.01.006>

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Pathways for synthesis of new selenium-containing oxo-compounds: chemical vapor transport reactions, hydrothermal techniques and evaporation method

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Abstract

Due to the low and close melting and sublimation temperatures (340 and 350 °C, respectively), the crystal growth of selenates and/or selenites is generally achieved using either chemical vapor transport routes, hydrothermal methods due to the good solubility and reactivity of $(\text{SeO}_3)^{2-}$ anions or isothermal evaporation synthesis. Here we report examples many new crystal structures obtained using these synthesis routes. Particularly, description of each process is given with theoretical and practical information assorted with description of selected structures.

Research Highlights

1. Three different methods for synthesis of new Se-containing oxocompounds are discussed.
2. Chemical vapor transport reactions are presented as a method allowing predicting possible mineral phases.
3. A key role of the acidity of the reactive medium in the course of the hydrothermal reactions is demonstrated.
4. Isothermal evaporation: simple method for synthesis of actinide oxocompounds with wide structural diversifications

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