

This article was downloaded by:

On: 29 January 2011

Access details: *Access Details: Free Access*

Publisher *Taylor & Francis*

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



## Phosphorus, Sulfur, and Silicon and the Related Elements

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t713618290>

### Study of Fluoroapatite Reactions: The Effect of Metaphosphate Melts on Fluorine-Containing Substances

H. Valdsaar<sup>a</sup>

<sup>a</sup> C&P Department, Jackson Laboratory, Chambers Works, E.I. du Pont de Nemours & Co., Inc., Deepwater, NJ, USA

**To cite this Article** Valdsaar, H.(1990) 'Study of Fluoroapatite Reactions: The Effect of Metaphosphate Melts on Fluorine-Containing Substances', *Phosphorus, Sulfur, and Silicon and the Related Elements*, 51: 1, 440

**To link to this Article:** DOI: 10.1080/10426509008040964

**URL:** <http://dx.doi.org/10.1080/10426509008040964>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.informaworld.com/terms-and-conditions-of-access.pdf>

This article may be used for research, teaching and private study purposes. Any substantial or systematic reproduction, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

## STUDY OF FLUOROAPATITE REACTIONS: THE EFFECT OF META- PHOSPHATE MELTS ON FLUORINE-CONTAINING SUBSTANCES

H. VALDSAAR

E.I. du Pont de Nemours & Co., Inc.,  
C&P Department, Jackson Laboratory, Chambers Works  
Deepwater, NJ 08023 USA

The interaction of metaphosphate melts with fluorine-containing substances was studied. The major variables were composition and temperature. Sodium metaphosphate in contact with fluorides or fluoroapatite gives rise to reactions above 550°C, which liberate fluorine in the form of volatile compounds, mostly as hydrogen fluoride. At least one gas containing phosphorus and fluorine is released from the melt. Evidence points to phosphoryl trifluoride ( $\text{POF}_3$ ). The relative amount of HF to  $\text{POF}_3$  depends on the concentration of combined hydrogen in the melt and water vapor in the atmosphere above the melt. The rate of the removal of the gaseous reaction products is markedly affected by the depth of the layer through which they have to diffuse. The interaction of metaphosphate melts with fluorides is a general reaction independent of the type of fluoride, and produces the same major products in the gaseous phase. Calcium ions are more effective in furthering the gas evolution from the melt than sodium ions. The structure of synthetic fluoroapatite is destroyed by sodium metaphosphate above 550°C, and under certain conditions the fluorine content of the sample is reduced by 80% within an hour. The yield in the fluorine-containing gases shows a maximum at about 640°C.