

This article was downloaded by:

On: 28 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>

### Application of the Peak Fitting Programme “Galactic” For FTIR-Analysis of OH-Ions in Natural and Synthetic Apatites

Rena Knubovets<sup>a</sup>; Mihkel Veiderma<sup>b</sup>; Kaia Tõnsuaadu<sup>b</sup>

<sup>a</sup> The Open University of Israel, aviv, Israel <sup>b</sup> Tallinn Technical University, Tallinn, ESTONIA

**To cite this Article** Knubovets, Rena , Veiderma, Mihkel and Tõnsuaadu, Kaia(1999) 'Application of the Peak Fitting Programme “Galactic” For FTIR-Analysis of OH-Ions in Natural and Synthetic Apatites', Phosphorus, Sulfur, and Silicon and the Related Elements, 147: 1, 415

**To link to this Article:** DOI: 10.1080/10426509908053687

**URL:** <http://dx.doi.org/10.1080/10426509908053687>

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.

## Application of the Peak Fitting Programme “Galactic” for FTIR-Analysis of OH-Ions in Natural and Synthetic Apatites

RENA KNUBOVETS<sup>a</sup>, MIHKEL VEIDERMA<sup>b</sup> and  
KAIA TÕNSUAADU<sup>b</sup>

<sup>a</sup>The Open University of Israel, Ramat Aviv, Tel Aviv, Israel and <sup>b</sup>Tallinn  
Technical University, Ehitajate tee 5, Tallinn, ESTONIA

Most of the studies on heavy metals binding ability of apatites have been carried out on hydroxyapatites (HAp)  $[\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2]$ . As the chemical characteristics of apatite depend substantially on the substitutions in its structure, the apatites with  $\text{F}^-$  substitution for  $\text{OH}^-$  and  $\text{CO}_3^{2-}$  for  $\text{PO}_4^{3-}$  were studied.

The apatites used in the study were synthetic precipitated apatites as well as Estonian and Israel phosphorites. The mole ratio of  $\text{CO}_3/\text{PO}_4$  and  $\text{F}/\text{Ca}$  in synthetic apatites varies in the range of 0.03-0.20 and 0-0.18, respectively. The removal characteristics of apatites for  $\text{Cd}^{2+}$  were examined in aqueous solutions with  $\text{pH}=6$  by means of the batch method.

The binding capacity of  $\text{Cd}^{2+}$  ions rises with the increase in the  $\text{F}^-$  content in HAp up to  $\text{F}/\text{Ca}$  ratio 0.09 and decreases after that. The increase in  $\text{CO}_3^{2-}$  substitution in the apatite structure decreases its binding capacity. The maximum amount of Cd bound with FHAp was 2.6 mg per 100 mg Ap ( $\text{Cd}/\text{Ca}=0.024$ ), with phosphorites 2.3 mg per 100 mg Ap ( $\text{Cd}/\text{Ca}=0.02$ ).

The mechanism of sorption depends on the nature of apatite. In the case of synthetic apatites the ion-exchange process dominates. However, with the increase of the carbonate content the adsorption mechanism becomes more important. The removal ability of natural apatites depends substantially on their surface area, proceeding mainly by ion exchange in the external surface layer. Anionic substitutions affect the binding capacity of apatites only a little, compared with  $\text{Mg}^{2+}$  substitutions [1].

### References

- [1] Galactic Peaksolve Fitting for Windows. Galactic Industries Corp., 1991-1995.