

appreciably unequal, these sites would also be disordered in  $P1$ . Similarly, the occupancy of at least one of the two ( $M$ , Zr) sites would be disordered if there is any Zr present. (The possibility that one site is entirely  $M$  and the other entirely Zr is ruled out both by the values of the parameter  $P_2$  and by the relatively unsatisfactory results obtained by GBG.) In any event, there is little prospect of detecting any slight deviations from the centrosymmetric  $P\bar{1}$  structure, particularly since GBG followed the usual (and regrettable) procedure of deleting the weakest reflections from their data set (see Marsh, 1981).

Finally, we come to the title question: How much Zr is present in either compound? I believe that the answer is 'Only a small amount'. The small amount would presumably be accompanied by a corresponding deficiency in the occupancy of the  $\text{Na}^+$  sites; according to Goodenough, Hong & Kafalas (1976), such a deficiency would be a prerequisite for  $\text{Na}^+$  mobility. It also seems probable that the amount of Zr can vary from one preparation to another, along with the conductivity of the crystals. I see little chance that the site of the additional proton, H, is other than fully occupied, because of the very short  $\text{O}\cdots\text{O}$  distance. Indeed, this strong  $\text{O}\cdots\text{H}\cdots\text{O}$  bond increases the rigidity of the  $\text{MHP}_2\text{O}_7$  framework (note the small size of

the  $U_{\text{eq}}$  values, Tables 1 and 2), which is another requirement for rapid ion transport (Goodenough *et al.*, 1976). Thus, the correct formula for the compounds is, presumably,  $\text{Na}_{1-2x}\text{M}_{1-x}\text{Zr}_x\text{HP}_2\text{O}_7$ , with  $x$  being 0.1 or less. Note, though, that the results reported here (Tables 1 and 2) were based on a model corresponding to  $x = 0$  – that is, to  $\text{NaMHP}_2\text{O}_7$ .

I greatly appreciate the advice and comments of Dr E. Fowles.

#### References

- ERMER, O. & DUNITZ, J. (1970). *Acta Cryst.* **A26**, 163.  
 GALI, S., BYRAPPA, K. & GOPALAKRISHNA, G. S. (1989). *Acta Cryst.* **C45**, 1667–1669.  
 GOODENOUGH, J. B., HONG, H. Y.-P. & KAFALAS, J. A. (1976). *Mater. Res. Bull.* **11**, 203–220.  
 HUGHES, E. W. (1941). *J. Am. Chem. Soc.* **63**, 1737–1752.  
 MARSH, R. E. (1981). *Acta Cryst.* **B37**, 1985–1988.  
 MARSH, R. E. & SCHOMAKER, V. (1979). *Inorg. Chem.* **18**, 2331–2336.  
 SCHOMAKER, V. & MARSH, R. E. (1979). *Acta Cryst.* **B35**, 1933–1934.

## International Union of Crystallography

*Acta Cryst.* (1990). **C46**, 2499–2500

### Prices of *Acta Crystallographica* and *Journal of Applied Crystallography*

The Executive Committee of the International Union of Crystallography has determined the following subscription rates and prices of back numbers for *Acta Crystallographica* and *Journal of Applied Crystallography* as from 1 January 1991.

#### *Acta Crystallographica*

The following rates will apply for Volumes A47, B47 and C47 (1991). All subscription rates are fixed in Danish kroner. The US dollar equivalents are no longer given because of rapid fluctuations in exchange rates.

#### Complete volumes, regular price per volume

Sections A, B & C (combined subscription)	Dkr 6700
Section A only	Dkr 1610
Section B only	Dkr 1610
Section C only	Dkr 3800

#### Complete volumes, reduced price for individuals

Sections A, B & C (combined subscription)	Dkr 1840
Section A only	Dkr 450
Section B only	Dkr 450
Section C only	Dkr 1080

All subscribers in the USA, Canada and Japan should add to the above subscription rates the additional charges for airfreighting as mentioned below.

The reduced-rate subscriptions are ordinarily only available to members of recognized scientific societies, and applications must be accompanied by a written undertaking that the journal is for the personal use of the subscriber and will not be made available to libraries, institutions *etc.* These conditions also apply to persons wishing to order back numbers at the reduced rates.

#### Single parts

The price of single parts of any Section of Volume 47 (1991) is Dkr 370.

### *Journal of Applied Crystallography*

The following rates will apply for Volume 24 (1991). All subscription rates are fixed in Danish kroner. The US dollar equivalents are no longer given because of rapid fluctuations in exchange rates

Complete volumes, regular price  
per volume Dkr 1470

Complete volumes, reduced price  
for individuals Dkr 400

All subscribers in the USA, Canada and Japan should add to the above subscription rates the additional charge for airfreighting as mentioned below.

The same conditions apply to reduced-rate subscriptions as in the case of *Acta Crystallographica* (see above).

#### Single parts

The price of single parts of Volume 24 (1991) is Dkr 370.

#### Airfreighting of copies to the USA, Canada and Japan

Deliveries of *Acta Crystallographica* and *Journal of Applied Crystallography* to the USA, Canada and Japan in 1991 will continue to be by air freight. The use of this service is obligatory for all subscribers in those countries. The charges in Danish kroner are as given below.

#### *Acta Crystallographica*

Sections A, B & C

(combined subscription)

Section A only Add Dkr 380

Section B only Add Dkr 90

Section C only Add Dkr 220

*Journal of Applied Crystallography* Add Dkr 70

#### Prices of back numbers

All these prices are fixed in Danish kroner. The US dollar equivalents are no longer given because of rapid fluctuations in exchange rates.

#### *Acta Crystallographica*

##### *Complete volumes, regular price per volume*

Vols. 1-23	Dkr 1610
Combined Vols. 24-38	Dkr 5820
Combined Vols. 39-46	Dkr 6700
Vols. A24-A46	Dkr 1610
Vols. B24-B38	Dkr 4430
Vols. B39-B46	Dkr 1610
Vols. C39-C46	Dkr 3800

##### *Complete volumes, reduced price for individuals*

Vols. 1-23	Dkr 450
Combined Vols. 24-38	Dkr 1640
Combined Vols. 39-46	Dkr 1840
Vols. A24-A46	Dkr 450
Vols. B24-B38	Dkr 1330
Vols. B39-B46	Dkr 450
Vols. C39-C46	Dkr 1080

#### Single parts

Single parts of Volumes 1-23 are not available. The price of single parts of any Section of other Volumes is Dkr 370.

#### *Cumulative Indexes, regular price*

Vols. 11-23 (1958-1967)	Dkr 120
Vols. 24-28 (1968-1972)	Dkr 120
Vols. 29-38 (1973-1982)	Dkr 150
Vols. 39-43 (1983-1987)	Dkr 150

#### *Cumulative Indexes, reduced price for individuals*

Vols. 11-23 (1958-1967)	Dkr 60
Vols. 24-28 (1968-1972)	Dkr 60
Vols. 29-38 (1973-1982)	Dkr 75
Vols. 39-43 (1983-1987)	Dkr 75

A few copies of the cumulative index for Volumes 1-10 (1948-1957) are also available, free of charge.

#### *Journal of Applied Crystallography*

##### *Complete volumes, regular price per volume*

Vols. 1-23 Dkr 1470

##### *Complete volumes, reduced price for individuals*

Vols. 1-23 Dkr 400

#### Single parts

The price of single parts of any volume is Dkr 370.

#### *Cumulative Indexes to Vols. 1-20 (1968-1987)*

Regular price	Dkr 150
Reduced price for individuals	Dkr 75

#### Orders

Orders for *Acta Crystallographica* and *Journal of Applied Crystallography* may be addressed to Munksgaard International Publishers Ltd, 35 Nørre Søgade, DK-1370 Copenhagen K, Denmark. Orders from subscribers in North America may alternatively be placed through Polycrystal Book Service, PO Box 3439, Dayton, OH 45401, USA.

*Acta Cryst.* (1990). C46, 2500

#### Bimonthly publication of Section A

From January 1991, *Acta Crystallographica* Section A will be published bimonthly. Additionally, *Fast Communications* will be published in Sections A and B of *Acta Crystallographica* and in *Journal of Applied Crystallography*.