

halogens too, makes reasonable to postulate decomposition in solution, $\text{Me}_2\text{bitt}^{2+}2\text{X}^- \rightarrow \text{Me}_2\text{tms} + \text{X}_2$. Although Me_2tms is characterized by one band at $277\text{ m}\mu$,⁽⁸⁾ this is not observed in $\text{Me}_2\text{bitt}^{2+}$ solutions, perhaps because its low intensity ($\epsilon = 11,000$) as compared with the strong absorptions of $\text{Me}_2\text{bitt}^{2+}$ in that region. (b) Neglecting the well known absorptions of FeCl_4^- ,⁽⁹⁾ it seems that all bitt^{2+} compounds display two bands in the u.v. region: (i) one between 270 and 280 $\text{m}\mu$, which in the case of I_3^- derivative seems to be obscured by the strong band of I_2 at 290 $\text{m}\mu$, (ii) one more intense band near 240 $\text{m}\mu$, present in all the compounds studied, which in the case of FeCl_4^- derivative should contain the absorption of the anion too, since the intensity in $\text{Me}_2\text{bitt}^{2+}2\text{FeCl}_4^-$ is too much higher than the one reported.⁽⁹⁾ Nevertheless, no interpretation of the origin of these two bands is still available.

It is interesting to establish that $\text{Me}_2\text{bitt}^{2+}\text{CuX}_3^{2-}$ can be synthesized in two alternative ways: (a) Reaction (1), above and (b) $\text{Me}_2\text{bitt}^{2+}2\text{X}^- + \text{Cu(I)X}$ $\text{X} = \text{Cl, Br}$. Further work is in progress about Raman spectroscopy of $\text{Me}_2\text{bitt}^{2+}$ haloderivatives, and possible reactions of type (b) with other metal halides.

Acknowledgement—We have to thank Dr. G. Contreras K., for his

continuous interest and valuable advice on the development of this work.

Instituto de Química
Universidad de Concepción
Casilla 3-C
Concepción Chile

HERNÁN CARBACHO H.
LUIS VICTORIANO L.

REFERENCES

1. J. Willemse and J. J. Steggerda, *Chem. Commun.* 1123 (1969).
2. V. Tamminen and E. Hjelt, *Suomen Kemi*, **23(B)**, 39 (1950).
3. P. T. Beurskens, W. P. J. H. Bosman and J. A. Cras, *J. Cryst. Mol. Struct.*, **2** (1972).
4. H. Carbacho and L. Victoriano, to be published.
5. F. A. Cotton and J. A. McCleverty, *Inorg. Chem.*, **3**, 1398 (1964).
6. H. C. Brinkhoff and A. M. Grotens, *Rec. Trav. Chim.*, **111**, 252 (1971).
7. W. J. Geary, *Coord. Chem. Rev.*, **7**, 81 (1971).
8. G. D. Thorn and R. A. Ludwig, *The Dithiocarbamates and Related Compounds*, p. 74. Elsevier, New York (1962).
9. P. Day and C. K. Jorgensen, *J. Chem. Soc.*, 6226 (1964).

J. inorg. nucl. Chem., 1975, Vol. 37, p. 1328. Pergamon Press. Printed in Great Britain

Some mixed metal tellurates

(Received 31 October 1974)

RECENTLY Brixner [1] has reported ordered perovskites of the type $A\text{LaBWO}_6$ (where $A = \text{Sr, Ba}$; $B = \text{Li, Na, K}$). In the course of studies on the vibrational and luminescence spectra of compounds of this type in this laboratory [2] we tried to prepare the analogous tellurates.

Samples were prepared by usual techniques. Powder diffraction patterns were obtained on a Philips diffractometer using $\text{CuK}\alpha$ radiation. The spectral measurements were performed as described elsewhere [2].

We found that SrLaLiTeO_6 and BaLaLiTeO_6 are ordered perovskites with lattice parameter $a = 7.91$ and 8.04 \AA , respectively. Surprisingly enough the corresponding compounds with Y instead of La do not exist. Instead of this a.o. a garnet phase is formed with composition $\text{Y}_3\text{Li}_3\text{Te}_2\text{O}_{12}$. This compound can also be made as a single phase. Its lattice parameter amounts to 12.24 \AA .

Hexavalent uranium shows a green emission of medium intensity in the perovskites SrLaLiTeO_6 and BaLaLiTeO_6 and an intense yellow emission in the garnet $\text{Y}_3\text{Li}_3\text{Te}_2\text{O}_{12}$. This emission will be investigated further.

The vibrational spectra of these perovskite tellurates are similar to those of ordered perovskites $A_2\text{BTeO}_6$ [2]. All bands are somewhat broader than usually. This is probably due to the disorder of di- and tri-valent ions on the larger cation sites.

The vibrational spectra of the perovskites $A\text{LaBWO}_6$ differ from those of the perovskites $A_2\text{BWO}_6$ [2]. Not only are all bands broader, but also the ν_1 mode is observed in the infrared spectrum (Fig. 1). This clearly indicates a deviation from inversion symmetry which is probably due to the mixed occupation of the larger cation sites. Note that in Sr-perovskites (e.g. Sr_2MgWO_6 [3]) ν_1 is not i.r.-active. The fact that in the corresponding tellurates the ν_1 mode is not observed in the infrared spectrum may be due to spectral overlap, since the difference between the position of ν_1 (720 cm^{-1} in Raman) and ν_3 (680 cm^{-1} in i.r.) is small. The numerical values relate to SrLaLiTeO_6 .

The cation distribution in the garnet $\text{Y}_3\text{Li}_3\text{Te}_2\text{O}_{12}$ is most probably $\{\text{Y}_3\}[\text{Te}_2](\text{Li}_3)\text{O}_{12}$ in view of the preference of Te^{6+} for 6-coordination in oxides. We calculated the number of internal tellurate vibrations to be expected in the vibrational spectra assuming molecular TeO_6 groups bound together by Y^{3+} and Li^+ ions. The site symmetry of Te is S_6 , the space group $Ia3d(O_h)^{10}$

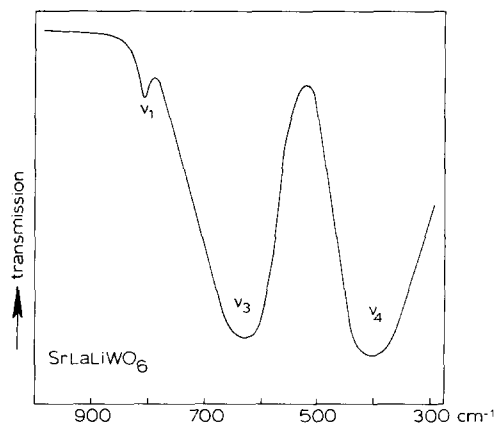


Fig. 1. I.R. spectrum of SrLaLiWO_6 in the region $900\text{--}300\text{ cm}^{-1}$.

and there are eight Te^{6+} ions per primitive cell. As a consequence we expect two ν_1 and four ν_2 components in the Raman spectrum and three ν_3 components in the i.r. spectrum. The exclusion principle is still valid. Our experimental results are as follows (values in cm^{-1}): Raman: 750 (w, ν_1); 730 (s, ν_1); 650, 600, 530 and 515 (all weak, ν_2); 467 and 432 (m, ν_3). i.r.: 710 (m, ν_3); 665 (s, br, ν_3); 630 (m, ν_3); 590 (s, ν_3); 490 (s, ν_4); 465 (m, ν_4); ≈ 420 (s, br, ν_4).

Our predictions are correct for the Raman spectrum; in the infrared spectrum there are more bands in the ν_3 region than expected. Perhaps there is a deviation from the ideal cation distribution. This point is under investigation.

Physical Laboratory
State University
Sorbonnelaan 4
Utrecht
The Netherlands

DENISE KROL
G. BLASSE

REFERENCES

1. L. H. Brixner, *Mat. Res. Bull.* **9**, 1041 (1974).
2. G. Blasse and A. F. Cormit, *J. Solid State Chem.* **6**, 513 (1973).
3. G. Blasse, *J. Inorg. Nucl. Chem.*, in press.