

decrease in χ_g with decreasing temperature, mostly pronounced in the case of molybdenum. Since we have no possibilities of carrying out magnetic measurements at lower temperatures than that of liquid air, we cannot decide, if this decrease in χ_g is a physical reality. Consequently the susceptibility of molybdenum at 80°K and 91°K have not been incorporated in the calculations mentioned above.

As average values for the specific magnetic susceptibilities in the temperature interval 97°K to 530°K for *molybdenum* and 80°K to 530°K for *tungsten* may be accepted the values 0.868×10^{-6} and 0.289×10^{-6} , respectively. The corresponding susceptibilities per gram-atom are 83.3×10^{-6} and 53.2×10^{-6} , respectively.

The susceptibilities were found to be independent of the field strength. The measurements arbitrarily selected for Table 1 exemplify this constancy.

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The Structure of Ammines of Ammonium Halides

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In a project covering structure investigations of ammines, formed with salts of alkali metal, alkaline earth metal and ammonium, the compounds $\text{NH}_4\text{Cl} \cdot 3\text{NH}_3$,

$\text{NH}_4\text{Br} \cdot 3\text{NH}_3$, $\text{NH}_4\text{I} \cdot 3\text{NH}_3$ and $\text{NH}_4\text{I} \cdot 4\text{NH}_3$ have been studied. The structures of these are essentially solved but they will be further refined by least square methods. A full account of the structure determinations will be given after these refinements are finished. Some preliminary data are given below.

The crystal structure determinations are based on three-dimensional X-ray data taken in a low temperature Weissenberg camera. Exposures made at -35° , -80° and -140°C give identical photographs for each compound, apart from effects due to different temperature factors and cell dimensions.

$\text{NH}_4\text{Cl} \cdot 3\text{NH}_3$: The crystals (m.p. $+10^\circ\text{C}$) are orthorhombic, space group $P 2_1 2_1 2_1$ with four formula units in a cell of dimensions $a = 8.795$, $b = 8.68$, $c = 8.989 \text{ \AA}$ (at -35°C). The atomic coordinates for chlorine were obtained from Patterson-Harker sections $P(\frac{1}{2}; y; z)$, $P(x; \frac{1}{2}; z)$ and $P(x; y; \frac{1}{2})$ and the coordinates for the nitrogens thereafter from electron density projections and sections. The preliminary atomic coordinates are: Cl: (0.042; 0.000; 0.443); N_0 : (0.477; 0.120; 0.284); N_1 : (0.049; 0.106; 0.025); N_2 : (0.232; 0.761; 0.191); N_3 : (0.232; 0.342; 0.319). The ammonium ion (to which N_0 belongs) is tetrahedrally surrounded by three ammonia molecules (nitrogens N_1 , N_2 and N_3) and one chloride ion; distances N-Cl: 3.26 Å; N-N: 2.83, 2.88 and 2.93 Å. The hydrogen atoms of the ammonium ions are evidently involved in these bonds.

The bromide and iodide compounds are isostructural with the chloride and possess the following cell dimensions:

$\text{NH}_4\text{Br} \cdot 3\text{NH}_3$: $a = 8.96$, $b = 8.996$, $c = 9.263 \text{ \AA}$ (-35°C). (This work was done in collaboration with R. Liminga.)

$\text{NH}_4\text{I} \cdot 3\text{NH}_3$: $a = 8.32$, $b = 9.91$, $c = 9.96 \text{ \AA}$ (-35°C). (The work was done together with G. Larsson.)

$\text{NH}_4\text{I} \cdot 4\text{NH}_3$: The work on this compound has been quite recently started and the structure is not yet completely elucidated. The crystals are probably tetragonal, space group $P 4/n$ with two formula units in a cell of dimensions $a = 8.94$, $c = 6.55 \text{ \AA}$ (-140°C). (The work was done together with E. Hadler Vihovde, Oslo.)

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