Methylammonium manganese(II) trichloride crystallizes with a hexagonal unit cell, \( a = 7.626(2) \) Å, \( c = 6.399(1) \) Å, \( Z = 2 \), space group \( P6_3/mmc \) or \( P6_3mc \). It is isostructural with CsCdBr_3.

### Crystal Data

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Crystal data for methylammonium manganese(II) trichloride, CH_3NH_3MnCl_3. By W. Bachmann, H. R. Oswald and J. R. Günter, Institute for Inorganic Chemistry, Zürich University, Rämistrasse 76, CH-8001 Zürich, Switzerland

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### Origin of specimens

Methylammonium manganese(II) trichloride is an intermediate product of the thermal decomposition of the perovskite-related layer lattice compound (CH_3NH_3)_2MnCl_4. Pure CH_3NH_3MnCl_3 has been obtained for the first time by isothermal decomposition at 240°C to constant weight. It is strongly hygroscopic at room temperature.

### Crystal data

Hexagonal, \( a = 7.626(2) \) Å, \( c = 6.399(1) \) Å, \( Z = 2 \), space group \( P6_3/mmc \) or \( P6_3mc \). The powder X-ray diffraction pattern was recorded on a focusing Guinier–de Wolff camera with Fe Kα radiation at room temperature, with KCl (\( a = 6.2931 \) Å) as internal standard. Relative intensities were measured on photographic film with a Joyce–Loebl double-beam microdensitometer.

The diffraction pattern was indexed hexagonally and the lattice constants were refined by a least-squares calculation (CDC computer of the Federal Technical College, Zürich).

### Comparison with related structures

From detailed comparisons of the powder X-ray diffraction patterns, it was concluded that CH_3NH_3MnCl_3 is isostructural with CsCdBr_3 (Swanson et al., 1972), CsCrCl_3 (Seifert & Klatyk, 1964), CsFeCl_3 (Seifert & Klatyk, 1966), CsCoCl_3 (Swanson, McMurdie, Morris & Evans, 1968), NhNiCl_3 (Swanson et al., 1968), RbCrCl_3 (Seifert & Klatyk, 1966), RbFeCl_3 (Engberg & Soling, 1963), RbNiCl_3 (Swanson et al., 1968), NhFeCl_3 (Amit, Zodkewitz & Makovsky, 1970), NhCoCl_3 (Amit et al., 1970; Swanson et al., 1968), NhNiCl_3 (Swanson et al., 1968), BaNiO_3 (Lander, 1951) and Li₂H₃O (West, 1934). All these structures are based on a hexagonal close-packed arrangement of the monovalent cations and the anions. It should be noted that no manganese compound with this simple structure has been reported yet. Known related manganese compounds are based on cubic or more complex close ion packings [CsMnF_3 (Swanson et al., 1972), RbMnCl_3 (Kestigian, Croft & Leipziger, 1967), CsMnCl_3 (Kestigian et al., 1967)].

Experiments on the production of single crystals of anhydrous CH_3NH_3MnCl_3 and studies on its hydrated form are in progress.

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### References


