Synthesis, Calorimetric Study, Infrared Spectroscopy and Crystal Structure Investigation of β-[Tetraethylammonium Tetramethylammonium Tetrachlorozincate(II)] [β]-[$(C_2H_5)_4N$][$(CH_3)_4N$]$ZnCl_4$

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Z. Naturforsch. **61b,** 1002 – 1006 (2006); received February 2, 2006

Synthesis, crystal structure and infrared description are reported for a new phase of tetraethylammonium tetramethylammonium tetrachlorozincate(II) β-[(TEA)(TMA)$ZnCl_4$]. Calorimetry study shows five endothermic picks at 165, 232, 280, 284, and 377 K. The compound crystallizes in the orthorhombic system, space group $P2_12_12$ (N° 18), with $Z = 4$ and $a = 13.099(3)$, $b = 13.119(2)$ and $c = 11.812(3)$ Å. The crystal structure consists of alternate organic-inorganic [$(TMA)^+/ZnCl_4{}^{2-}$] layers and organic sheets $(TEA)^+$. Organic and inorganic groups are not disordered. Its main geometrical features are those commonly observed in the atomic arrangements of $(TEA)_2ZnCl_4$ and $(TMA)_2ZnCl_4$.

Key words: β-[Tetraethylammonium Tetramethylammonium Tetrachlorozincate (II)], Phase Transition, Infrared Spectroscopy, Crystal Structure