

# **Solvothermal Synthesis and Crystal Structure Determination of Tris-(ethyleneamine-ammonium) Tetraselenoantimonat: Non-Centrosymmetry Mediated by an Extended Unusual N-H...N Hydrogen Bonded Network?**

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The title compound has been synthesized under solvothermal conditions by the reaction of elemental chromium, antimony and selenium in a solution of 40% 1,2-ethanediamine (en) in methanol. The crystal structure consists of tetrahedral  $\text{SbSe}_4^{3-}$  -anions which are connected by monoprotonated 1,2-ethanediamine ( $\text{enH}^+$ ) cations *via* N-H...Se hydrogen bonding. The  $\text{enH}^+$  cations are joined *via* strong N-H...N hydrogen bonds between the ammonium hydrogen and the amino nitrogen atom forming four distinct chains, each built up of three crystallographically independent  $\text{enH}^+$  cations. Two of these chains are running parallel to [100], the other two are parallel to [010]. Based on this arrangement different centrosymmetric or non-centrosymmetric hydrogen bonding patterns are possible, but only in one chain the sequence of  $\text{NH}_2$  and  $\text{NH}_3^+$  groups was determined by X-ray diffraction.

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