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# **Abstracts**

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## Supramolecular Structure of 1,10-Phenanthroline-1-ium Cation with a Tin(IV) Anion

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Single crystals of the 1,10-phenanthroline-1-ium salt of the complex monocation,  $[\text{SnCl}_2(\text{CH}_2\text{CH}_2\text{CO}_2\text{H})(\text{CH}_2\text{CH}_2\text{CO}_2)]$  was investigated as part of a study of pseudo symmetric structures. The six coordinate tin exhibits pseudo octahedral coordination by two *cis* Cl atoms, two *trans* C atoms, and two O atoms *trans* to the Cl atoms. One proton has been transferred from the originally neutral tin dicarboxylic acid complex to form the complex anion and a phenanthroline-1-ium monocation. The Sn-O distances for the chemically distinct oxygen atoms of the five member chelate rings of the carboxylate and carboxylic acid groups thus formed differ by more than 0.2 Å (2.306(2) and 2.519(2) Å) leading to large differences in the Cl atoms coordinated *trans* to the two O atoms (Sn-Cl distances are 2.404(1) and 2.486(1) Å).

One nitrogen atom of the 1,10-phenanthroline-1-ium is protonated ( $d[\text{N}-\text{H}] = 0.78$  Å) while the other nitrogen is not. Protonation of the N causes the C-N-C angle to increase (122.14° in the protonated ring vs 116.51° in the unprotonated ring). The protonated ring exhibits increased Lewis acidity and links into a network with the anions using an N-H...O (2.688 Å), a C-H...O (3.155 Å), and two C-H...Cl (3.578 and 3.876 Å) bonds. The remaining rings also participate in hydrogen bonding by forming significantly weaker C-H...O and C-H...Cl interactions. These layers are joined into a 3-dimensional network of interactions by two distinct alternating face-to-face ( $\pi-\pi$ ) interactions along the  $a$  axis.