

**Synthesis and Spectroscopic Characterization of $CF_2XC(O)NHP(O)(C_3H_8)_2$ (X = F & Cl),
Crystal Structure of $CF_3C(O)NHP(O)(C_3H_8)_2$**

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Carbacylamidophosphates, with a $-C(O)NHP(O)-$ skeleton, are attractive to study due to their applications as O,O-donor ligands for metal complexation. In this research, two new phosphoramidate compounds with formula $CF_3C(O)NHP(O)(C_3H_8)_2$ (1) $CClF_2C(O)NHP(O)(C_3H_8)_2$ (2) have been synthesized and characterized by 1H , ^{13}C , ^{19}F and ^{31}P NMR and IR spectroscopy. Moreover, single crystal X-ray diffraction has been done for compound 1. Single crystal X-ray analysis shows that 1 belongs to triclinic system, space group P-1, with $a = 8.67090(50)$ Å, $b = 9.46780(59)$ Å, $c = 9.67810(70)$ Å, $\alpha = 98.2284(23)^\circ$, $\beta = 111.9294(30)^\circ$, $\gamma = 105.9316(34)^\circ$ and $Z = 2$. The P=O and P-N bond distances for these compounds are within the values characteristic of analogous phosphorus compound. The bond angles values show that the P atom has a distorted tetrahedral configuration. Moreover, all three N atoms in the phosphoramidate 1 are almost planar.

Keywords: X-ray Crystallography, NMR, phosphoramidate, P-N bonds