# Crystal and Molecular Structure of $P(C_6H_5)_5 \cdot 0.5$ THF

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Z. Naturforsch. **59b,** 1411 – 1414 (2004); received August 18, 2004

*Dedicated to Professor Hubert Schmidbaur on the occasion of his 70th birthday*

Pentaphenylphosphorus crystallizes from tetrahydrofuran (THF) as $P(C_6H_5)_5 \cdot 0.5$ THF (triclinic space group: $P\bar{1}$, $a = 10.095(4)$, $b = 10.252(3)$, $c = 12.725(3)$ Å, $\alpha = 71.21(1)$, $\beta = 76.98(3)$, $\gamma = 87.12(1)^\circ$, $Z = 2$). Its molecular structure is an almost perfect trigonal bipyramid with significantly longer axial than equatorial P-$C_{Ph}$ bonds (P-$C_{ax}$ 1.982(2)/1.979(2), P-$C_{eq}$ 1.853(2)/1.845(2)/1.847(2) Å). It differs from the well established structure of solvent-free $P(C_6H_5)_5$ (P. J. Wheatley, J. Chem. Soc. 2206 (1964)) in the relative orientation of the phenyl rings with respect to each other (axial rings) and with respect to the equatorial $PC_3$ plane (equatorial rings) but not in the trigonal-bipyramidal (tbp) geometry at phosphorus. Differences in the geometry around the central atom had been found previously for $Sb(C_6H_5)_5$ (square pyramid) and $Sb(C_6H_5)_5 \cdot 0.5C_6H_{12}$ (tbp) but not in $As(C_6H_5)_5$ and $As(C_6H_5)_5 \cdot 0.5\ C_6H_{12}$ (both tbp).

*Key words:* Phosphorus, Structural Chemistry, Pentacoordination, Structure Determination