

Metal assisted hydrolysis of spirocyclic phosphazenes: Crystal structures of novel mono- and di-palladium complexes

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The reactions of (amino)spirocyclic-cyclotriphosphazene, $N_3P_3(NMe_2)_4(NHCH_2CH_2NH)$ (1) with palladium chloride leads to facile hydrolytic cleavage of the diazaphospholidine ring to yield novel monometallic and bimetallic complexes, $[PdCl_2 \cdot \{HN_3P_3(O)(NMe_2)_4(NHCH_2CH_2NH_2)\}]$ and $[PdCl \{N_3P_3(NMe_2)_4(NCH_2CH_2NH_2)\}]_2$ (O) respectively. The structures of these complexes have been determined by single crystal X-ray diffraction; in the former, an (oxophosphazadienyl)ethylenediamine is chelated to the metal whereas in the latter, an oxobridged bi(cyclotriphosphazene) acts as a hexadentate NNNNNN donor ligand in its dianionic form. The intermediacy of a four-membered chelate complex $[PdCl_2 \cdot 1]$ is inferred from ^{31}P NMR spectroscopy. A stable complex of this type has been isolated from the reaction of $PdCl_2$ with $N_3P_3(NMe_2)_4(NHCH_2CH_2CH_2NH)$ (2) containing a six-membered PN_2C_3 ring. The structure of $[PdCl_2 \cdot 2]$, as determined by X-ray crystallography, reveals the presence of a four-membered chelate ring in which the metal is bonded to one of the nitrogen atoms of the diaminoalkane moiety and an adjacent phosphazene ring nitrogen atom.

*For correspondence