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Reactions of Vinylendiphosphine Dioxides with Phosphorus and Tantalum Pentafluorides

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REACTIONS OF VINYLENDIPHOSPHINE DIOXIDES WITH PHOSPHORUS AND TANTALUM PENTAFLUORIDES

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Reactions of $\text{trans-R}_2\text{P(O)CH=CHP(O)R}_2$ R=Ph (I), Tol (II),
 $\text{Ph}_2\text{P(O)CH=CHP(O)PhEt}$ (III), $\text{Et}_2\text{P(O)CH=CHP(O)PhEt}$ (IV), and
 $\text{cis-R}_2\text{P(O)CH=CHP(O)R}_2$ R=Ph (V), Tol (VI) with PF_5 and TaF_5
have been studied in MeCN and CH_2Cl_2 solutions by means of
 ^1H , ^{19}F , ^{31}P and ^{13}C FT NMR. The results indicate that in
solutions the trans-isomers of dioxides (I-IV) can be mono-
dentate ligands or bridging groups, and that they use one
or two donor centers in complex formation with pentafluor-
ides. In the latter case the ligands attach two Lewis acids
to form binuclear complexes. The cis-isomers of dioxides
(V-VI) can be monodentate or bridging ligands, and can also
form chelate with substitution of fluoride-atoms and with
formation of tetrafluorocations. The differences in rela-
tive stability of tetrafluoro-complexes of phosphorus and
tantalum with chelate ligands were detected. In the case
of tantalum complexes the intermolecular exchange of
fluorine atoms occurs faster. The kinetic parameters of the
fluorine exchange process are calculated.