

SYNTHESIS AND PROPERTIES OF BINUCLEAR DECAKIS
(TRIFLUOROPHOSPHINE) TECHNETIUM(0) COMPLEX

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Decakis (trifluorophosphine) technetium (0) $Tc_2(PF_3)_{10}$ has been synthesized by means of cryochemical method. Compound $Re_2(PF_3)_{10}$ described in literature previously [1] has been obtained by using the same technique. The synthesized trifluorophosphine complexes of Tc and Re which are close chemical analogues have similar physical - chemical properties. Both compounds have white colour. They are hydrolysed in the wet air. Vapour pressure of $Tc_2(PF_3)_{10}$ is $(6 \pm 3) \cdot 10^{-3}$ torr at 293K. When heated up to 550K $Tc_2(PF_3)_{10}$ decomposes with Tc and PF_3 being liberated. The $Tc_2(PF_3)_{10}$ bands 455 vw, {492 ms, 498 ms} ($\nu_2 PF_3$), 734 sh, 856 s ($\nu_3 PF_3$), 896 s ($\nu_1 PF_3$), 1016 w.br., 1122 w.br., 1237 w.br. and the $Re_2(PF_3)_{10}$ bands 460 vw, {492 ms, 508 ms} ($\nu_2 PF_3$), 744 sh, 859 s ($\nu_3 PF_3$), 893 s ($\nu_1 PF_3$), 1021 w.br., 1155 w.br., 1261 w.br., cm^{-1} were detected in infrared spectra of solid samples. The bands located above $1000\ cm^{-1}$ were identified to be phosphide Tc and Re and phosphorus oxides impurities. The masses corresponding to M_2^+ , $M(PF_3)_x^+$, $M_2P(PF_3)_y^+$, $MPF(PF_3)_y^+$, $M_2PF(PF_3)_y^+$ ions, where $M = Tc, Re$, $X = 0+4$, $Y = 0+8$ for Tc complex and $X = 0+4$, $Y = 0+3$ for Re complex were present in mass spectra of the compounds synthesized.

1 T. Kruck, A. Engelmann, W. Lang, Chem. Ber., 99, 2473 (1966).