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Reduction of rhenium (V) oxo Schiff Base Complexes with triphenyl phosphine ligands

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One approach to the treatment of cancer is to direct beta-emitting radionuclide to the cancer site where the radiation destroys the cancer cells. This can be achieved by coordinating the radioisotope in a very stable environment and linking it to a specific biological targeting molecule, which interacts specifically with particular cancer cells. It is necessary to have extremely stable *in vivo* radionuclide complexes so that limited amounts of radiation are released to other parts of the body before the radionuclide can reach the cancer cells. Isotopes of radioactive Rhenium are characteristic of such a nuclide. Our emphasis was to obtain a Rhenium (III) metal ligand complex since the lower oxidation state is more kinetically inert relative to Rhenium (V).

The method employed was to first produce the Re^{V} -ligand complex, $[\text{Re}^{\text{VOCl}}(\text{Sal}_2\text{phen})]$, by reacting a 1:2 molar ratio of $\text{TBA}[\text{Re}^{\text{VII}}\text{OCl}_4]$ to Sal_2phen . Next, $[\text{Re}^{\text{VOCl}}(\text{Sal}_2\text{phen})]$ was reacted with three equivalents of triphenylphosphine to determine whether a mono-substituted Re^{V} complex or a di-substituted Re^{III} complex was formed. After purifying the product by solvent extraction, the coordinated complex was reacted with ammonium hexafluorophosphate, NH_4PF_6 , to induce crystallization of the target compound, $[\text{Re}^{\text{III}}(\text{PPh}_3)_2(\text{Sal}_2\text{phen})][\text{PF}_6]$. Preliminary ^1H NMR, and FT-IT spectra suggest formation of *trans*- $[\text{Re}^{\text{III}}(\text{PPh}_3)_2(\text{sal}_2\text{phen})]\text{PF}_6$. The $\text{Re}=\text{O}$ stretch at 951.36 cm^{-1} observed for $[\text{ReOCl}(\text{sal}_2\text{phen})]$ in the IR spectrum is missing from our product, implying the Re (III) product has been formed.