Nebiat Sisay, Chemistry

University: Southern Univeristy at New Orleans
Year in School: Sophomore
Hometown: New Orleans, Louisiana
Faculty Mentor: Dr. Silvia Jurisson, Chemistry
Funding Source: Stevens' Chemistry Program

Reducution of rhenium(V)-oxo schiff base complexesith triphenyl phosphine ligands

Nebiat Sisay, Stepahnie R. Lane, Silva S. Jurisson

The purpose of this research is to produce radiopharmaceutical drugs for the possible use in therapy and diagnosis of cancer. A radiopharmaceutical drug is composed of a radioactive element contained within chelating agent and linked to a biological targeting molecule. This can be achieved by complexing the radioisotope and conjugating the complex to a biologically active targeting molecule, such as a peptide antibody or antibody fragment. The biological targeting molecule directs radiation to specific peptides, antibodies and antibodies' fragments. The amount of dosage is limited to non-targeted tissue that occurs when free radionuclide is released from a decomposing molecule. Higher kinetic stability will maximize the localization of the radioisotope to the cancer sites and minimize the radiation dose to non-target tissues. This research was a continuation to seek the best pathway that would easily enable us to synthesize a kinetically inert metal complex [$Re(Sal_2Phen)$] attached to a ligand. The rigid Rhenium(V)-oxo Schiff base complex is found in the following form: [$ReO(Sal_2Phen)Cl$]. Initially salicylic aldehyde reacted with bis-2-phenlinediamine to get sal_2phen. This tetradentate Schiff base ligand was reacted with TBA [$ReOCl_4$] yielding [$ReOCl(Sal_2Phen)$]. The reduction of Rhenium(V)-oxo core to Rhenium is obtained by reacting [$ReO(Sal_2Phen)Cl$] with a triphenyl phosphine (PPh_3) in dichloromethane and ethanol. Products obtained from this reaction were $^1[Re(Sal_2Phen)(PPh_3)_2]$, $^2ReCl(Sal_2Phen)PPh_3$, and $^3[ReO(Sal_2Phen)PPh_3]$.Analysis of the major product were performed through crystals through mass spectrometry, hydrogen and phosphorus NMR, infrared spectra and x-ray crystallography.