

Public Abstract

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Graduation Term:WS 2007

Department:Chemistry

Degree:MS

Title:Synthesis and Characterization of Noval Phosphinimine Ligand Systems for Potential Applications in Radiopharmaceuticals

Multidentate phosphinimine ligands, $C_{25}H_{49}N_2P_2Si_2$ (2), $C_{34}H_{38}N_2P_2Si_2$ (3), and $C_{50}H_{66}N_3P_3Si_3$ (4), were synthesized in near quantitative yields by Staudinger reaction using appropriate phosphines. Coordination chemistry of 2 and 3 with Re was performed and the X-ray crystallographic study of the Re ion-pair complex of ligand 2 is reported. Radiolabeling of ligands 2, 3 and 4 with ^{99m}Tc was performed. Simple mixing of ligand solutions with aqueous $^{99m}TcO_4^-$ in saline solution produced ion-pairs with more than 95% yields. All three ion-pairs produced are stable for more than 24 h in organic media and in alcohols. The ion-pair produced with ligand 3 ($[(NH_2PPh_2CH_2PPh_2NH \text{ or } O)^+ (^{99m}TcO_4)^-]$), upon heating has resulted in the neutral complex $[(NH_2PPh_2CH_2PPh_2NH \text{ or } O)^+ (^{99m}TcO_3)]$. Upon heating the ion-pair ($[(NH_2PPh_2CH_2PPh_2NH)^+ (ReO_4)^-]$ in the presence of Verkade's superbase led to the rearrangement of the ligand via cleavage of the P-C-P bridge to produce P-N-P bridged compound.