Anal. Calcd. for $Ta_2C_{27}H_{41}NCl_4$: C, 36.71; H, 4.68; N, 1.59. Found: C, 37.22; H, 4.69; N, 2.00. Calcd. for $Ta_2C_{28}H_{42}N_{1.2}Cl_4$(1.2py): C, 37.38; H, 4.70; N, 1.87. ^1H NMR (C_6D_6): ppm 9.61, 8.87, 6.78, 6.76, 6.59 (m, 1 each, py), 2.3, 2.16 (s, inequivalent Cp" groups), 0.102 (s, 1, Ta-H). The other hydride resonance could not be found. In bromobenzene both hydride resonances could be found at 0.28 and 0.46 ppm. IR (cm^{-1}, Nujol): 1625 (Ta-H).

$[TaCp'Cl_2H]_2$(py) and deuterated derivatives were prepared similarly. ν_{TaD} = 1165 cm^{-1} in $[TaCp'Cl_2D]_2$(py).

^1H NMR (C_6D_6): 9.719, 8.938, 6.733, 6.600, 6.382 (br, 1 each, pyridine), 2.63 (m, Cp-$C\underline{H}_2CH_2$), 2.443, 2.403, 2.367, 2.341, 2.301, 2.225, 2.110 (s, Cp-CH_3), 0.863 (m, Cp-$CH_2C\underline{H}_3$), 0.287 (br s, 1, MH). IR (Nujol): 1625 (s, br, MH).

Reaction of PMe_3 with $[TaCp'Cl_2H]_2$

A solution of $[TaCp'Cl_2H]_2$ (0.4 g, 0.5 mmol) in 30 ml of ether was cooled to -78°C. A solution of PMe_3 (5 mmol) in ether was added by cannula. The color of the solution changed from green to purple. The color of the solution changed from green to purple. A shiny grey solid precipitated as the temperature was raised to approximately 20°C. This was collected by filtration; yield 0.32 g (73%).

Anal. Calcd. for $Ta_2Cl_4C_{25}H_{45}P$: C, 34.11; H, 4.92. Found: C, 33.29; H, 4.99. Mol. Wt. Calcd.: 880. Found: 803.

Reaction of PMe_3 with $[TaCp''Cl_2H]_2$

The $[TaCp''Cl_2H]_2$ (0.1 g, 0.13 mmol) was dissolved in toluene and cooled