to -78°. A solution of PMe_3 in toluene was added dropwise to the stirred solution until the color of the solution changed from green to purple. Pentane was added and the mixture was filtered to give a light purple powder; yield 0.085 g (77%).

Reaction of $[TaCp'Cl_2H]_2(PMe_3)$ with Carbon Monoxide

To a solution of $[TaCp'Cl_2H]_2$ (1.0 g, 1.2 mmol) in 150 ml of ether, was added 0.4 ml PMe_3. A purple solution resulted and some grey solid precipitated. The reaction mixture was pressurized with CO (30 psi). The grey solid dissolved. After 3 hours, the color had changed from purple to yellow-brown. The solvent was removed in vacuo and the residue was crystallized from toluene/pentane (80:20). Cubic crystals were obtained in 2 crops; yield 0.45 g (41%). ^1H and ^{31}P NMR spectra were identical to those of an authentic sample of $Ta_2Cp'_2Cl_4(H)(CHPMe_3)(O)$.

Reaction of $Ta_2Cp'_2Cl_4H(CHO)$ with $AlCl_3$

$AlCl_3$ (0.2 g, 1.5 mmol) was added to a toluene solution of $Ta_2Cp'_2Cl_4H(CHO)$ 0.83 g, 1 mmol) along with 20 μl (0.11 mmol) of nonane as an internal standard. Some $AlCl_3$ did not dissolve. The mixture was stored at 0° for 16 hours, then a sample was removed for GLC analysis. Methane (0.3 mmol) was found.

Reaction of $Ta_2Cp'_2Cl_4H(CHO)$ with $AlCl_3$ in the Presence of H_2

$Ta_2Cp'_2Cl_4H(CHO)$ (0.4 g, 0.48 mmol) and $AlCl_3$ (0.08 g, 0.6 mmol) were added to a round bottom vacuum flask. The flask was evacuated and cooled to -78°. Chlorobenzene (20 ml) saturated with H_2 was added to the first flask