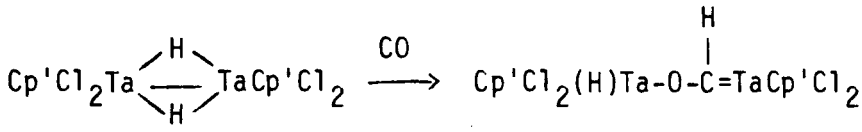
$[TaCp'Cl_2H]_2$, $[TiCp_2H]_2$, reacts with donor molecules such as PPh_3 to give monomeric Ti(III) complexes, $TiCp_2(H)(L)$.[19] However, Ti(III) should be more accessible than Ta(IV). It is interesting to note that preliminary results suggest that $[NbCp'Cl_2H]_2$ reacts with CO to give $NbCp'Cl_2(CO)_2$, but no formyl complex analogous to $Ta_2Cp'_2Cl_4(H)(CHO)$. Again the explanation could be that the Nb-Nb bond is more susceptible to cleavage to give Nb(IV) species than the Ta-Ta bond to give a Ta(IV) species. While the interpretation of the role of the Ta-Ta bond as solely a link holding the two metals together is plausible, its role may be far more subtle. For example, the formation of paramagnetic centers in the CO adduct (see above) may be important in order to insure rapid hydride transfer to CO at a rate which competes with Ta-Ta bond cleavage.

One plausible variation of the result we have found here would be formation of a "tantaloxy-carbene" complex (equation 6) analogous to Bercaw's



(6)

"zirconoxy-carbene" complexes.[5] This seems plausible since complexes such as $TaCp''(CHCMe_3)Cl_2$[20] and $TaCp''(CHPh)Cl_2$,[21] as well as $Cp_2(R)Nb{=}CHOZr(H)Cp''_2$,[5] are known. Almost certainly the reason why the "open" structure shown in equation 6 is not found is that each metal in such a species would be electron deficient (14 electrons). By "closing up" the structure each metal achieves a maximum electron count. A closed structure for $Cp''_2(H)ZrO(H)C{=}WCp_2$, for example, would be less likely since the count about tungsten is 18 electrons and about zirconium is that preferred for biscyclopentadienyl complexes, 16 electrons. It must be in part this sequestering of the formyl ligand between the two metals which stabilizes the formyl complex toward the back reaction, but,