09.X-01 SOLIDS AND MOLECULES--A THEORETICAL CONNECTION. By J. K. Burdett, Department of Chemistry, The University of Chicago, Chicago, Illinois 60637, USA.

The past ten or fifteen years have seen the development of several related symmetry and overlap based models of molecular stereochemistry. Along with perturbation theoretical ideas, molecular chemists now have a good theoretical basis with which to understand molecular structure. Traditional theoretical approaches to the structure of the solid state are often rather naive and old fashioned by comparison. In our lecture we will highlight the use of some well established 'molecular' techniques in looking at the structures of extended solid state arrays.

09.X-02 X-RAY DIFFRACTION STUDIES ON HIGH-OXIDATION STATE ORGANOMETALLIC COMPLEXES OF TANTALUM AND TUNGSTEN. By Melvyn Rowen Churchill, Department of Chemistry, S.U.N.Y. at Buffalo, Buffalo, New York 14214, U.S.A.

We have characterized structurally a variety of complexes of tantalum and tungsten containing such ligands as alkylidenes (=CHR), alkylidynes (≡CR), benzyne, acetylenes etc. Certain aspects of the resulting structures mimic intermediates proposed for the olefin metathesis reaction. This work has now been extended to imido (=N-R) and di-imido (=N-N=) complexes including $(Ta(=CHCMe_3)(CH_2CCMe_3)(PMe_3)_3)_2(\mu\text{-}N_2)$ (see JACS, 102, 7809 (1980)) and $(TaCl_3(THF)(Pbz_3))_2(\mu\text{-}N_2)$.

AlR_3 adducts of the metal-alkylidyne linkage have also been studied; among these are the species $W(\equiv CH.AlR_3)(PMe_3)_3Cl$ and $W(CH.Al_2Me_4Cl)(PMe_3)_2(C_2H_4)CH_3$.

The metal-ligand bonding in these and in related complexes (including μ-formyl complexes) will be discussed.

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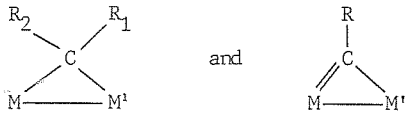
09.X-03 MIXED METAL CLUSTERS - PREDICTION, OBSERVATION AND RATIONALISATION. By Judith A.K. Howard, Department of Inorganic Chemistry, The University, Bristol BS8 1TS, England.

The discovery that $[Pt(cod)_2]$ reacted with perfluoropropene to give $[Pt_2\{\mu\text{-}C(CF_3)_2\}(cod)_2]$, rather than the η^2 adduct, suggested to us that such a synthetic route might be exploited to produce mixed metal clusters, using the idea that C = M, C ≡ M and possibly M = M or M ≡ M bonds would react with low valent metal complexes as do the analogous C = C and C ≡ C linkages.

The synthesis has proved remarkably successful and many compounds of the type



have been prepared and characterised.[2,3,3,4]

Extending the concept to provide tri- and tetra-nuclear clusters has resulted in some interesting and often unexpected complexes. The preparation and characterisation of some of these will be discussed, in particular where the expectations and observations mismatch.

New clusters include: $[Ru_2Pt(\mu\text{-}CO)_2(CO)(PPh_3)(\eta\text{-}C_5Me_5)]$[5], $[Ru_4Pt(\mu\text{-}CO)_4(\eta\text{-}C_5Me_5)_4]$, $[Co_3Fe(CCH_2)(CO)_9(\eta\text{-}C_5Me_5)]$, $[Co_3Fe(CCH_2)(CO)_{12}(\eta\text{-}C_5Me_5)]$, $[Os_3Au_2(CO)_4(PPh_3)_2]$, $[FePtW_2(\mu_3\text{-}CC_6H_4Me)_2(CO)_7(\eta\text{-}C_5H_5)_2]$, and $[FeRhW(\mu_3\text{-}CC_6H_4Me)(\mu_2\text{-}CO)(CO)_5(\eta\text{-}C_5H_5)(\eta\text{-}C_9H_7)]$.[6]

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