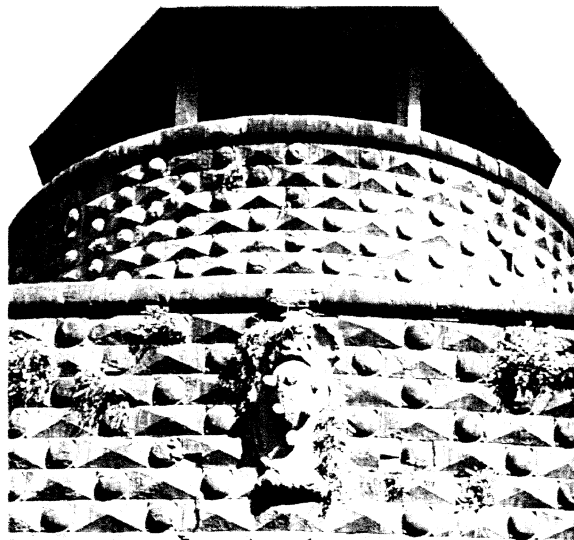


# Second Korean-Italian Meeting (KOSEF-CNR) on Inorganic Chemistry

Perspectives in Organometallic, Bioinorganic,  
Material, and Supramolecular Chemistry

# 2<sup>nd</sup>

# KIMIC



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# REVERSIBLE INTERCONVERSION BETWEEN $\mu\text{-}\eta^2,\eta^2\text{-}$ AND $\mu_3\text{-}\eta^2,\eta^2,\eta^2\text{-C}_{60}$ ON A CARBIDO PENTAOSMIUM CLUSTER FRAMEWORK

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Exohedral metallofullerenes have recently attracted much attention concerning the effects of metal coordination on the chemical and physical properties of  $C_{60}$ . Most approaches to forming metal complexes have been based on the metal- $C_{60}$   $\pi$ -complex chemistry, which has resulted in  $\eta^2\text{-C}_{60}$ ,  $\mu\text{-}\eta^2,\eta^2\text{-C}_{60}$ , and  $\mu_3\text{-}\eta^2,\eta^2,\eta^2\text{-C}_{60}$  ligands on monometallic (most metals), bimetallic ( $\text{Re}_2$ ,  $\text{Ru}_2$ ,  $\text{Ir}_2$ ), and metal cluster ( $\text{Ru}_3$ ,  $\text{Os}_3$ ,  $\text{Ru}_5\text{C}$ ,  $\text{Ru}_6\text{C}$ ,  $\text{PtRu}_5\text{C}$ ) complexes, respectively. Metal clusters can potentially accommodate all the  $C_{60}$  bonding modes shown above, but the interaction of  $C_{60}$  with cluster frameworks has been, thus far, dominated by the face-capping cyclohexatriene-like bonding mode,  $\mu_3\text{-}\eta^2,\eta^2,\eta^2\text{-C}_{60}$ . The  $\mu\text{-}\eta^2,\eta^2\text{-C}_{60}$  bonding mode has never been observed on a cluster framework, although it has been postulated as an intermediate for the transformation of  $\text{Os}_3(\text{CO})_{11}(\eta^2\text{-C}_{60})$  to  $\text{Os}_3(\text{CO})_9(\mu_3\text{-}\eta^2,\eta^2,\eta^2\text{-C}_{60})$  by loss of carbonyl ligands. The interconversion among the three kinds of the  $C_{60}$  ligands has remained to be established in the area of the  $C_{60}$ -metal cluster chemistry. We have recently captured the elusive  $\mu\text{-}\eta^2,\eta^2\text{-C}_{60}$  bonding mode on an  $\text{Os}_5\text{C}$  cluster framework, and furthermore demonstrated that the two  $C_{60}$  bonding modes,  $\mu\text{-}\eta^2,\eta^2\text{-}$  and  $\mu_3\text{-}\eta^2,\eta^2,\eta^2\text{-}$ , are reversibly interconvertible.