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New rhenium carbonyl cluster complexes containing bridging hydrocarbyl and bridging mercury groups

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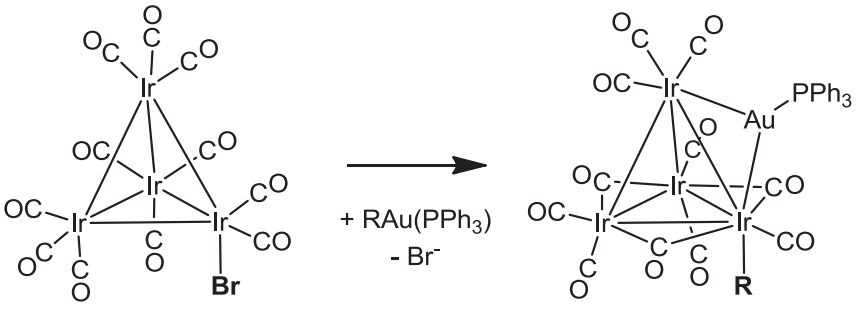
ABSTRACT

The new rhenium–mercury complexes $[Re_2(CO)_8(\mu\text{-HgI})(\mu\text{-}\eta^1\text{-}C_6H_5)]_2$, **2** and $[Re_2(CO)_8[\mu\text{-HCC(H)}C_4H_9]_2(\mu_4\text{-Hg})$, **3** were obtained from the reactions of $Re_2(CO)_8[\mu\text{-Au(PPh}_3)](\mu\text{-}\eta^1\text{-}C_6H_5)$, **1** with HgI_2 and of $Re_2(CO)_8[\mu\text{-HCC(H)}C_4H_9](\mu\text{-H})$ with $Hg(C_6H_5)_2$, respectively. In the solid state compound **2** is dimer of $Re_2(CO)_8(\mu\text{-HgI})(\mu\text{-}\eta^1\text{-}C_6H_5)$ that held together by iodide ligands that asymmetrically bridge between the two mercury atoms. Each dirhenium group is formally electronically unsaturated and contains one bridging $\eta^1\text{-}C_6H_5$ ligand. Compound **3** contains two $Re_2(CO)_8[\mu\text{-HCC(H)}C_4H_9]_2$ groups held together by a quadruply bridging *spiro*-structured mercury atom.

Introduction

In recent studies it has been shown that arylgoldphosphine compounds, such as $(PPh_3)Au(C_6H_5)$, can be readily oxidatively added to activated 3rd row polynuclear metal carbonyl cluster complexes to yield metalcarbonyl cluster complexes containing aryl ligands and bridging gold phosphine groupings, e.g. Eqs. (1)–(3) [1–3]. In some cases, the aryl ligands have adopted unusual bridging coordination modes that can result in interesting physical and chemical properties, such a hindered rotation about the metal–metal bond [4].



$[Ir_4(CO)_{11}Br]^-$ $Ir_4(CO)_{11}(R)[\mu\text{-Au(PPh}_3)]$, R = CH_3, C_6H_5, 2-$C_{16}H_9$ (1)

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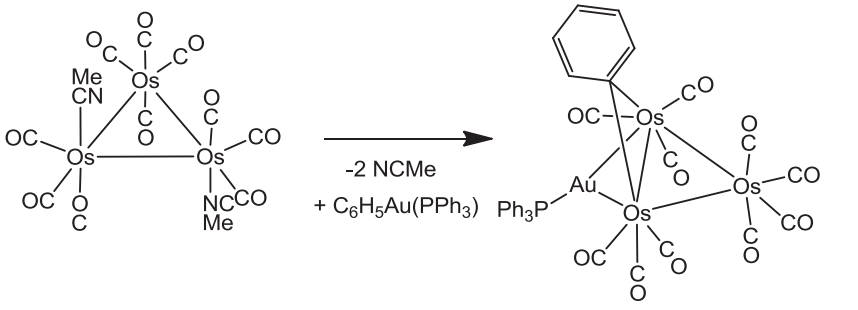
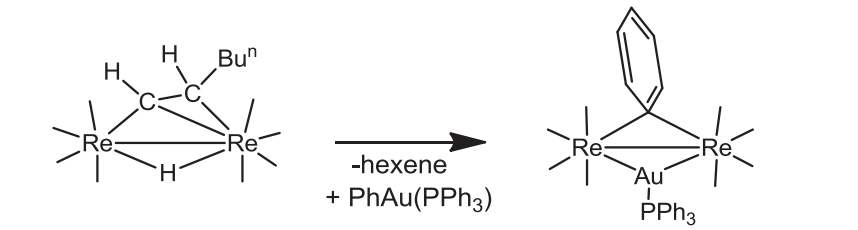


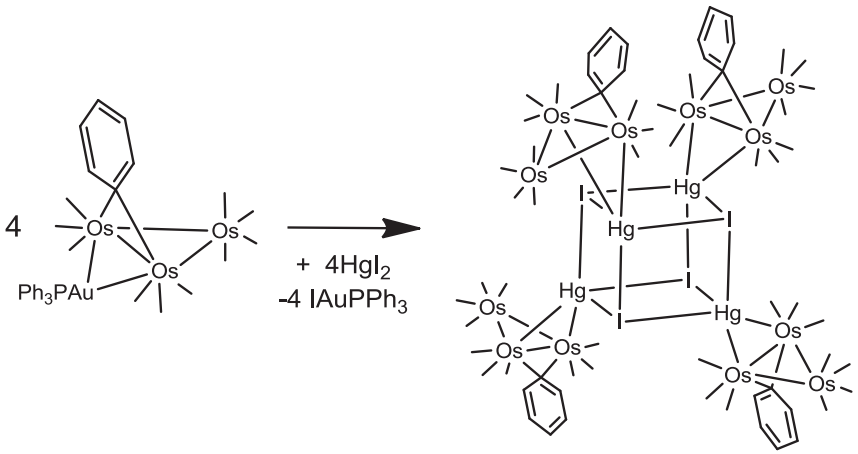
$Os_3(CO)_{10}(NCMe)_2$ $Os_3(CO)_{10}(\mu\text{-}C_6H_5)[\mu\text{-}Au(PPh_3)]$ (2)



$Re_2(CO)_8[\mu\text{-}HCC(H)Bu](\mu\text{-}H)$ $Re_2(CO)_8[\mu\text{-}Au(PPh_3)](\mu\text{-}C_6H_5)$, **1** (3)

We have found that the gold phosphine group can be replaced in some of these complexes in reactions with mercuric halides, Eq. (4) [5].

We have now investigated the reaction of $Re_2(CO)_8[\mu\text{-}Au(PPh_3)](\mu\text{-}\eta^1\text{-}C_6H_5)$, **1** with HgI_2. We have found that the $AuPPh_3$ group is replaced by a bridging HgI group with concomitant formation of $IAu(PPh_3)$ and the dirhenium product $Re_2(CO)_8(\mu\text{-}HgI)(\mu\text{-}$



$[Os_3(CO)_{10}(\mu\text{-}C_6H_5)[\mu\text{-}HgI]_4$ (4)