Fullerene - metallocene molecules different types

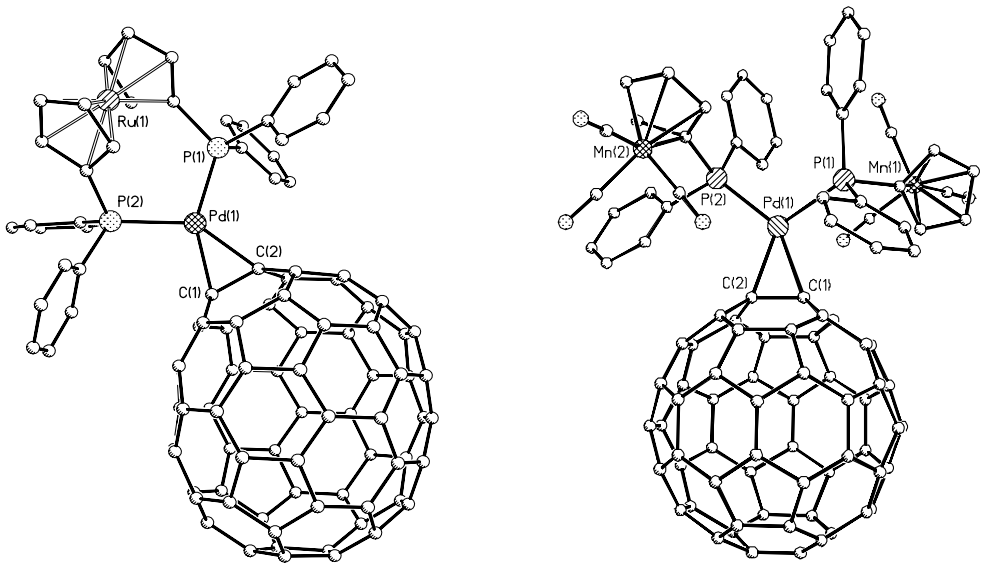
V.I. Sokolov

Nesmeyanov Institute of Organoelement Compounds RAS, 119991 Moscow, Russia

We have recently developed novel synthesis of the Pd and Pt complexes with C_{60}, C_{70} and the P-ligands having the metallocenyl or optically active groups. It has been found that fullerenes are able to take ML_2 moiety out of some platinum metals compounds such as R-Hg-PtL_2R' or R_2ML_2 to afford η^2 complexes. We used this approach for the high-yield synthesis of the organometallic derivatives of [60]- and [70]fullerenes with various P-ligands. A number of palladium and platinum complexes have been synthesized including the first optically active fullerenyl metal complexes C_nM[(+)DIOP], M = Pd, Pt; n=60,70 and, very recently, the optically active palladium C_{60} complexes with the axially chiral ligand of bithienyl series, tetraMe-BITIOP [1] and BITIANT, as well as the *heterometallic* fullerene derivatives containing cymantrenyl or ruthenocenyl groups in the ligand, for example

$$2\ C_n + Pd_2(dba)_3{\cdot}C_6H_6 + 2\ (Ph_2P\text{-}C_5H_4)_2Ru \rightarrow 2\ (\eta^2\text{-}C_n)Pd(Ph_2P\text{-}C_5H_4)_2Ru$$

Single crystals of all complexes were grown and analyzed by X-ray method. Their structures were confirmed by spectroscopic methods (NMR, UV-vis, CD).



The other way to combine the fullerenyl and σ-bonded metallocenyl fragments such as $(C_5H_4)Mn(CO)_3$, $(C_5H_4)Ru(C_5Me_5)$, or $(Me_4C_4)Co(C_5H_4)$ within the limits of the same molecule is the well-known cycloaddition, namely, Prato and Wudl reactions, using metallocene aldehydes [2] or diazo [3] compounds respectively.

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[1] V.V.Bashilov, V.I.Sokolov et al., *J.Organomet.Chem.* **690**, 4330 (2005).
[2] N.V.Abramova, V.I.Sokolov, S.M.Peregudova et al., *Russ.Chem.Bull.* **56**, #2 (2007).
[3] R.Pellicciari, B.Natalini, V.I.Sokolov et al., *Synth.Commun.* **33**, 903 (2003).