## **Metal Complexes of Fullerene Fragments**

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Nowadays metal complexes of fullerenes constitute the largest class of fullerene derivatives. In contrast, study of open geodesic polyarenes that map onto the fullerene surfaces and therefore referred to as 'fullerene fragments' is a new area of research. To form metallated products of fullerene fragments, we use gas phase deposition reactions with volatile transition metal complexes. In contrast to traditional solution studies, this technique readily affords metal complexes in crystalline form to allow their X-ray structural characterization. Using co-deposition, we have successfully prepared the first metal complexes of corannulene [1], dibenzo[a,g]corannulene [2], and hemifullerene [3]. X-ray structural analysis revealed an  $\eta^2$ rim coordination of the above fullerene fragments in their Rh(II) and Ru(I) complexes. Importantly, multiple metal coordination to a ligand was readily achieved under gas phase conditions to force rare polydentate bridging modes of fullerene fragments. This has resulted in unique complexes ranging from discreet to extended 1D, 2D, and 3D networks. The type of supramolecular architecture is dictated by the geometry and curvature of the fullerene fragment.

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