

Foreword to the special volume on Carbon-rich Organometallics

Carbon-rich organometallic compounds represent a new and rapidly growing subfield at the interface of organic and organometallic chemistry. Because of the potential importance of this area we have decided to organize this special issue which is devoted exclusively to the subject of organometallic complexes containing 'carbon-rich' ligands. Carbon-rich ligands generally exhibit various states of unsaturation due to deficiencies in the number of hydrogen atoms normally used to saturate the valence shell of their carbon atoms. The carbon-rich ligand fulfills important architectural and topologic tasks such as orchestrating the electronic interactions between several different metal centers. Combinations of the various structural elements of organic chemistry with the sometimes exotic and unusual geometries of organometallic groups allows the creation of novel and surprising topologies in this family of compounds. Linkages between different metal centers via organic networks can confer unusual optical, electronic and electrophoric or catalytic properties to these materials which extend far beyond those of their purely organic counterparts.

One will find in this issue of the *Journal of Organometallic Chemistry* a variety of metal compounds with ligands consisting of long polyyne chains, (Gladysz et al.), hexatriynylated Fischer carbene complexes (H. Fischer et al.), organometallic phenylenevinylenes (W. Beck et al.), several contributions dealing with alkynylated clusters (R.D. Adams et al.), alkynylated π -complexes (T. Müller et al., U. Bunz et al., C. LoSterzo et al.), and supramolecular species as

illustrated by organometallic rigid rods (D. Mohler et al.).

Despite its vigorous development during the last decade, this field is still in its infancy. The successful tailoring of *through-space* and *through-bond* interactions in organometallic species will result in better understanding of intramolecular electron transfer. The introduction of different extended conjugated organic systems strongly suggests the potential use of carbon rich organometallics as molecular wires. Extended transition metal moieties at the end of the organic ligand will enable facile electron transfer to and from metal surfaces (i.e. organometallic 'alligator clips' for molecular wires). Another important opportunity to develop carbon-rich organometallics could occur through exploitation of the metal coordination sites, which could ultimately lead into reversibly crosslinked nanoscale and mesoscopic materials with uniquely useful mechanical and electrophoric properties.

It is still too early to predict accurately where this exciting field will develop. All of the structures reported possess a natural beauty, originating from their novel compositions, their intrinsic symmetries and their unusual molecular geometries. We predict that the joy of chemical synthesis coupled with the thrills of structure determination will motivate chemists to continue to create even more elaborate and remarkable carbon-rich organometallic compounds and materials.

Uwe H.F. Bunz and Richard D. Adams
University of South Carolina, Columbia, SC 29208, USA