DEVELOPMENT OF NOVEL ORGANOMETALLIC CLUSTER CHEMISTRY

Organometallic clusters are compounds containing metal-metal bonds. We are interested in molecules containing different transition metals, as well as those of mixed transition metals-main group elements. More recently, we have also begun looking at those containing d and f block elements. The confluence between transition metal chemistry and main group or lanthanide chemistry can be expected to bring forth unusual bonding modes and chemistry. The central question in our investigations into heteronuclear clusters is “how and in what way can clusters containing two (or more) different types of metal atoms interact synergistically to produce new reactivity patterns?” We sought new clusters and reactivities, followed by detailed mechanistic investigations in the latter.

BIOORGANOMETALLIC CHEMISTRY ESPECIALLY OF CLUSTERS

Bioorganometallic chemistry lies at the confluence of organometallic and biological chemistry. The current activities in this new field is already very wide-ranging and varied; from a search for new treatments to various types of cancers to new analogues of antimalarials, imaging agents, biocatalysts, and biomedical chemoenzymes. We synergised the first bioconjugate between a phospholipid and an organometallic cluster and demonstrated its use as a tag in cell imaging in the mid-infrared. We also discovered that some osmium clusters exhibit remarkable anticancer activity through the induction of apoptosis.