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Editor's Page

Our cover shows the photochemically reversible hydrogen atom transfer between methyltitanium fluoride and methylidenetitanium hydride fluoride. These, of course, are not molecules that we can have in a bottle on our shelf, but they are real molecules nonetheless that do exist, albeit under very special conditions. Most organometallic chemists carry out their reactions in a temperature range between −100 and ca. +200 °C, but there is another chemistry that is carried out at very low temperature, for the most part in frozen noble gas matrices (4 K for neon, 7 K for argon). In the case of our cover molecules, it was the reaction of laser-ablated titanium atoms with methyl fluoride that had been codeposited with gaseous argon on a cryogenically cooled window of an FT-IR spectrometer which produced them. One of the most active practitioners of such matrix isolation chemistry is Professor Lester Andrews of the University of Virginia, author, together with Han-Gook Cho, of the review in this issue of *Organometallics* on the methylidene and methylidyne complexes of the group 4−6 transition metals—their matrix preparation and spectroscopic and theoretical investigations concerning them.

Such matrix isolation experiments open a whole new world of chemistry. Species generated in this way often are models for intermediates in stoichiometric and catalytic processes carried out under "normal" conditions. In some cases, they have been the first examples of new compound classes, "ambient temperature versions" of which have been prepared only later. They could provide a connection to astrochemistry by the preparation of examples of species that are abundant in outer space. In short, matrix isolation chemistry is a fascinating subject which should be coupled more strongly with organometallic chemistry.

Lester Andrews, the senior author of this review, obviously finds matrix chemistry fascinating: he has pursued research in this area very creatively and productively for all of his professional life. He obtained his Ph.D. degree at the University of California at Berkeley in 1966. His thesis research, carried out under the guidance of George Pimentel, was concerned with spectroscopic studies of reactions of lithium atoms in inert gas matrices. He has been at the University of Virginia since 1966. In the 40 years since then he has published nearly 700 papers on matrix isolation chemistry, an impressive and outstanding body of research concerned with species such as metal oxides, free radicals, hydrogen-bonded complexes, molecular ions, metal hydrides, methylidene and methylidyne complexes, and metal hydroxides, to name just a few. These species have been studied in the main by infrared spectroscopy. In recent years, DFT structure and frequency calculations have served as a valuable backup in his investigations to assist in the assignments of his spectroscopic data.

Professor Andrews' coauthor Han-Gook Cho, professor of chemistry at the University of Incheon in South Korea, spent a sabbatical year at the University of Virginia with Professor Andrews in 2003−2004 and returns each winter for a few months of research in the Andrews laboratory. A Michigan State Ph.D., Professor Cho was a postdoctoral associate with H. L. Strauss at the University of California at Berkeley.

The cover figure was kindly provided by Professor Andrews.

Dietmar Seyferth
Editor

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