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Coordination Chemistry Reviews 252 (2008) 2155

COORDINATION CHEMISTRY REVIEWS

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Preface

"The NMR machine is broken. Now what do I do?" It does not happen often, but unfortunately, machines being what they are; there can be an occasional problem. The lament of this unhappy Ph.D. student is simply a reflection of how dependent we have become on having a high field, high resolution, and multinuclear NMR instrument working on both solids and solutions, available more or less every day.

Looking back, the organic chemist has been profiting from this versatile methodology for more than 50 years, and since the 1970s, when two-dimensional methods became relatively accessible, so have the biochemists. Although the inorganic chemists were a trifle slower, they quickly jumped on the bandwagon as soon the instruments became routinely multinuclear. Although protons are not always the nucleus of choice for this group, the ability to relatively quickly measure ^{10,11}B, ^{19}F, ^{29}Si, ^{31}P, and ^{117,119}Sn (amongst others), as well as a selection of transition metals such ^{51}V, ^{103}Rh, ^{107,109}Ag, ^{183}W and ^{195}Pt, opened the floodgates.

This issue, dedicated to *Applications of NMR in Inorganic Chemistry*, reflects not only the considerable progress in the various fields of inorganic and organometallic chemistry, made possible due to the measurement of these and other nuclei, but also looks at a variety of NMR techniques. Silvio Aime looks at exchange and relaxation phenomena on nano-sized systems in connection with MRI studies, while Lothar Helm uses high-pressure methods together with the help of ^{17}O and ^{199}Tc to learn about the kinetics of water exchange. Alceo Macchioni and co-workers study aggregation and ion pairing via pulsed gradient spin-echo diffusion measurements and the same methods are also present in the contribution on metallo-supramolecular chemistry from Aurelia Pastor and co-workers. Simon Duckett probes reaction mechanisms related to hydrogenation chemistry via parahydrogen and Janet Blüml reports on the new insights available in heterogeneous catalysis via solid-state NMR methods. Several of the papers rely strongly on 2-D NMR methods: Luca Ronconi and Peter Sadler in connection with metals in medicinal chemistry, Zoltan Szabo, in his paper on the interactions of metal ions with adenine-nucleotides and this author in our ^{31}P and ^{13}C studies concerned with unexpected structure and bonding in Ru (II) and Pd (II) complexes of chiral ligands.

Several contributions combine classical coordination chemistry with main group studies: Tiziana Berengheli and co-workers use ^{11}B and ^{19}F spins to study perfluoroaryl borane compounds and Silviane Sabo-Etienne and co-workers discuss the bonding of boranes and silanes to transition metals via and ^{11}B and ^{29}Si methods. Many of the articles have a strong organometallic component. Bob Morris reports on dihydrogen and dihydride ligands in connection with structural properties of iron group complexes and comments on the various methods (including T_1 studies) for recognizing the differences between these two types. Pablo Espinet and co-workers review the applications of ^{19}F NMR in fluorinated aryl organopalladium chemistry (and confront some of the problems involved in handling second order NMR spectra). David Glueck makes extensive use of ^{31}P NMR in Metal (Duphos)-Catalyzed Asymmetric Synthesis, and Dieter Rehder summarizes ^{51}V NMR in organovanadium compounds, with some emphasis on CO complexes.

All in all, a mix of different NMR methods and nuclei, with impressive applications in the areas of molecular structure and reaction kinetics in both the solid and solution states. Returning to the question posed at the start of this preface; the answer is surely, "fix it as soon as possible".

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8 February 2008

doi:10.1016/j.ccr.2008.02.007