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Editor's Page

For the subject of the cover essay in this issue of *Organometallics*, I chose one whose literature is voluminous: organoalkali-metal compounds. To make the literature coverage and the writing manageable, I have restricted my discussion to the historically important alkyl and aryl derivatives of lithium, sodium, and potassium. Even so, this account of their history will have to be published in two parts.

The cover molecules that introduce Part 1 of this essay are Avery Morton's *n*-amylsodium, to which he devoted over 20 years of his research career at MIT, and phenyllithium, which Georg Wittig used to such great advantage.

The present issue contains Part 1 of this story, which deals for the most part with the preparation of the alkali-metal alkyls and aryls by the reactions of organic halides with alkali metals and, by halogen–metal exchange, with other organoalkali-metal compounds. During the first 100 or so years (∼1850–1960) that they were known and used, almost nothing was known about the solid-state structures of the alkali-metal alkyls and aryls or about the nature of the species present in their solutions. They were generated in solution or as suspensions in organic solvents with their users in blissful ignorance about exactly what they were working with. Chemists who prepared and used them simply wrote their empirical formulas in their papers, e.g., $C_5H_{11}Na$ and C_6H_5Li for our cover molecules, and this is how they showed up in monographs and textbooks. Thus, we show them as chemists thought about them at the time. Actually, this is how we still see them written today in most papers and textbooks in which their applications in organic, organometallic, and polymer chemistry are described.

Despite the lack of knowledge concerning their structure and bonding, they became very useful synthetic reagents. Among the organoalkali-metal compounds, those of lithium have become the reagents of choice. They are easier to prepare, store, and use, and most are soluble in organic solvents. They tend to be less reactive than their sodium and potassium counterparts, but donor solvents and Lewis base additives can enhance their reactivity. As a result, organolithium chemistry is well developed and still actively pursued today. In retrospect, it seems ironic that the much more difficult to prepare and handle, more dangerous, and nasty organosodium and -potassium compounds were discovered and utilized first, some 70 years before the organolithium compounds came on the scene—at a time when chemists were not well prepared to deal with them. But deal with them they did, for the most part using them in situ or in a two-step process without isolating them.

Part 2 of this essay will cover other preparative routes to organoalkali-metal compounds and also will describe the development of our knowledge of the solid-state structures of organoalkali-metal compounds, beginning with the brilliant powder X-ray diffraction studies of Erwin Weiss, and of the organoalkali-metal species in solution, made possible by the advent of NMR spectroscopy.

My thanks to Professor Arnold L. Rheingold for the cover molecule figure.

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Editor

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