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Editor's Page

An Introduction to the Review by Barnard in This Issue of *Organometallics*

The carbonylation of aryl and vinyl halides in the presence of palladium complexes and nucleophiles is a versatile route to esters, amides, carboxylic acids, and aldehydes. Although it was first described by Richard Heck over 30 years ago, the less user-friendly conditions and substrate limitations have rendered this reaction less popular than the other C−C coupling reactions that bear his name. Many of these obstacles have now been overcome through extensive screening of suitable combinations of ligands, substrates, nucleophiles, pressure, solvent, and temperature. Whereas the suitability of aryl iodides, bromides, and tosylates as substrates was established early on, chelating alkylphosphine ligands have now been developed that allow the near-quantitative conversion of many aryl chlorides. Understanding the factors that control reactivity still presents a serious challenge, however; why, for example, is the conversion of *o*-chloropyridine quantitative whereas under identical conditions *m*-chloropyridine fails to react? And why does H_2NCH_2Ph give quantitative conversion to the corresponding amide whereas H_2NPh does not?

The widespread use of Heck carbonylation in the synthesis of fine chemicals and pharmaceuticals and the interest shown by industrial catalysis laboratories testify to its success. It is therefore fitting to discuss this reaction from an industrial perspective. Christopher Barnard, of the Liquid Phase Catalysis group of Johnson Matthey UK, summarizes recent progress in turning palladium-catalyzed carbonylation into a user-friendly, highly efficient synthetic tool. Alkoxycarbonylations, aminocarbonylations, and reductive carbonylations to aldehydes are critically discussed, supported by informative data tables.

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