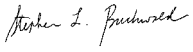
Transition Metal-Catalyzed Cross-Coupling and the Heck Coupling Processes: Powerful Reactions for Carbon-Carbon and Carbon-Heteroatom Bond Formation

Stephen L. Buchwald



The use of transition-metal catalysts for the concatenation of small, readily available building blocks into more complex structures is now commonplace in both academic and industrial laboratories. It is noteworthy that these processes are used in organic, inorganic, organometallic, materials, and bioorganic chemistry as well as in toxicology. The pioneering work of Kumada and Corriu, Heck, Negishi, Suzuki and Miyaura, Stille, Kosugi and Migita, Sonogashira and others laid the foundation for the success that has been subsequently realized. More recently, many research groups have made important contributions that have greatly expanded the accessibility, utility and scope of these methods. While progress has been significant, a great deal of work remains to be done in order to render these processes more generally applicable to polyfunctionalized systems, particularly with respect to their use by discovery chemists in the pharmaceutical industry. Given the efforts underway, I am confident that significant improvements will be forthcoming.

Stephen L. Buchwald

Camille Dreyfus Professor of Chemistry, Massachusetts Institute of Technology, Cambridge, MA 02139, USA
Fax: (+1)-617-253-3297, e-mail: sbuchwal@mit.edu

  DOI: 10.1002/adsc.200404335