

CONFERENCE

Post-OMCOS-XI Symposium on the Cross-Coupling Reaction (Thirty Years of the Cross-Coupling Reaction)

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On August, 2001, a conference dedicated to thirty years of the cross-coupling reaction was held in Kyoto (Japan). This relatively small conference (about 200 participants) was nevertheless a quite remarkable event, and I think it useful to give some information about the conference to readers of the *Zhurnal Organicheskoi Khimii*. It is known that the main task of organic chemistry is building up of a carbon–carbon bond. In the nature this problem is usually solved via reactions like aldol condensation. Thirty years ago Kumada (Japan) and Corriu (France) discovered an easy and efficient method for creation of C_{sp^2} – C_{sp^2} , C_{sp^2} – C_{sp^3} , and C_{sp^2} – C_{sp} bonds via reaction of aryl or vinyl halides with organometallic compounds catalyzed by transition metal complexes. Since then, different versions of this reaction have become the main procedure for creation of carbon–carbon bonds, especially of those involving aromatic compounds, and the number of publications appeared on this topic amounts to thousands.

Cross-coupling reactions are widely used in the synthesis of natural molecules and biologically active compounds and (in the recent years) for preparation of various organic materials, mostly molecular conductors and materials with interesting optical properties. Such reactions were called after the scientists who had discovered them [Stille (Sn), Suzuki (V), Negishi (Zn), Kumada (Mg), Hiyama (Si), Sonogashira (RC≡CH)].

However, as it frequently occurs, the course of history demands some corrections. As with the Heck reaction which was discovered by Mizoroki a year earlier (now the name *Mizoroki–Heck reaction* is already accepted), it turned out that Migita and Kosugi were the first to report on the Stille reaction, that the Kumada reaction must be called Tamao–Kumada reaction, and that the Suzuki reaction is the Miyaura–Suzuki reaction.

The most remarkable feature of the conference was that all the “founders of the feast” (except for Stille

who was tragically killed in an air crash) took part in its work. K. Tamao was the Chair of the conference, and T. Hiyama and N. Miyaura were the co-chairs.

The conference was organized interestingly. Its first part included historical reviews made by the people who stood at the source of a discovery and who contributed most to its fulfillment: A. Yamamoto, J.K. Kochi, R.J.P. Corriu, K. Tamao, S.-I. Murahashi, E. Negishi, and T. Hayashi. All lectures were reported brilliantly; unfortunately, they were not heard by a large and especially young audience. Such classical chemists as Kochi and Corriu succeeded in performing a profound analysis in their brief communications and highlighting the contributions of those chemists who had paved the way to creation of the prominent method of modern organic synthesis. First of all is Karasha. A part of the title of R.J.P. Corriu's lecture (*A French-Japanese “Cuisine”*) reflects a very important point: the given field of chemistry, as well as transition metal-catalyzed organic synthesis as a whole, was contributed mostly by Japanese chemists (note that E. Negishi who works in USA is closely connected with Japan and that J.K. Kochi is half-Japanese).

The invited lectures, in which the historical aspect was also considered, were read by scientists who (to the belief of the organizers) also contributed much and were still contributing to the given field: K. Sonogashira, M. Kosugi, N. Miyaura, T. Hiyama, V. Snilckus (Canada), S.P. Nolan (USA), I. Urawa (Eisai Co. Ltd., Japan), A. de Meijere (Germany), I.P. Beletskaya (Russia), J.F. Hartwig (USA), S.E. Denmark (USA), M. Lautens (Canada), T. Banno (Hokko Chemical Ind. Co. Ltd., Japan), and T.I. Luh (Taiwan).

The final and the only plenary lecture was delivered by Prof. A. Suzuki. Chairman Prof. Tsuji emphasized that the cross-coupling reaction has become the most widely used one for building up carbon–carbon bond.

It should be noted that cross-coupling reactions are now considered in a wider sense: They include not only formation of C–C bonds but also C_{sp²}–E (where E is Si, Sn, B, and transition metals) and C_{sp²}–X (where X is a heteroelement such as P, N, S, Se, etc.). Remarkable advantages were achieved along this way.

The conference has a considerable scientific value, and all lectures read therein will be published in

a special issue of the *Journal of Organometallic Chemistry*. Short communications and posters were introduced mainly by Japanese chemists, and they reflected their numerous advances in the field of metal-complex catalysis, as we repeatedly reported. Unfortunately, the given field of chemistry is not so popular in Russia, although increasing number of research teams begin to utilize cross-coupling reactions.