Manganese-Catalyzed Aerobic Heterocoupling of Aryl Grignard Reagents

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An improved protocol has been developed for the MnCl2-catalyzed cross-coupling reaction of two arylmagnesium bromides under dioxygen. The reaction was achieved by using the Grignard reagents in a 2:1 ratio and 20 % of MnCl2. Very good yields of the heterocoupling product were obtained when the limiting Grignard reagent underwent little homocoupling under the reaction conditions. Arylmagnesium bromides that contain p-methoxy, p-(dimethylamino), p-fluoro, and p-chloro substituents were shown to afford high product yields in the cross-coupling reactions with a variety of substituted aryl Grignard reagents. Heterocyclic Grignard reagents, on the other hand, were less effective substrates for this transformation because of the rapid homocoupling of these reagents under the reaction conditions.