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Novel ligands of the azine family for complexing with metals have been obtained as a result of the uncatalyzed C–C coupling reactions of quinoline, quinoxaline, 1,10-phenantroline, and their N-oxides with (1-oxido-3-phenyl-1,4-diazaspiro[4.5]deca-1,3-dien-2-yl)lithium.

Key words: C-H functionalization, azines, azine-N-oxides, aldonitrones, S_N^H reactions, ligands

1. Introduction

Nucleophilic C−H functionalization of arenes and heteroarenes proves to be a very efficient synthetic methodology, corresponding to atom economy[1] and other principles of green chemistry.[2] Currently, the methods not requiring any preliminary substrate functionalization provide a good complementary basis to the widespread cross-coupling reactions,[3] which are based on using the transition metal catalyzed transformations of organohalides or their synthetic equivalents. The direct functionalization of C–H bond in aromatics by action of nucleophiles[4] can be performed according to two different ways, namely, either in the presence of transition metal catalysts or by using metal free processes. A variation of the latter method is the methodology of nucleophilic (hetero)aromatic substitution of hydrogen (S_N^H reactions) in electron deficient systems.[5]

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