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Functional vinyl-1,8-naphthyridine copper(I) complex as efficient synergistic catalyst with KI for N-arylation coupling reactions

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An efficient and novel functional vinyl-1,8-naphthyridine copper(I) complex has been exploited as a synergistic catalyst for the cross-coupling reactions of aryl halides with imidazoles, benzimidazole, or pyrazole, offering a practical approach for C–N bond formation. Remarkably, this catalytic system operates under aerobic conditions with a low catalyst loading (2% molar fraction) and an inexpensive base. The protocol exhibits excellent tolerance towards aryl halides bearing diverse functional groups, including methyl, methoxy, acetyl, fluoro, nitrile, and nitro groups, among others. It consistently furnishes the corresponding coupling products in moderate to high yields. In total, 31 examples have been demonstrated, with the catalytic yields reaching up to 96%.

Keywords: Vinyl-1,8-naphthyridine, Copper (I) complex, Imidazole, Benzimidazole, Pyrazole, Cross-coupling reaction, N-Arylation