Category

Synthesis of Heterocycles

Key words

oxazolines

oxazines

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palladium catalysis

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A General and Efficient Palladium-Catalyzed Carbonylative Synthesis of 2-Aryloxazolines and 2-Aryloxazines from Aryl Bromides

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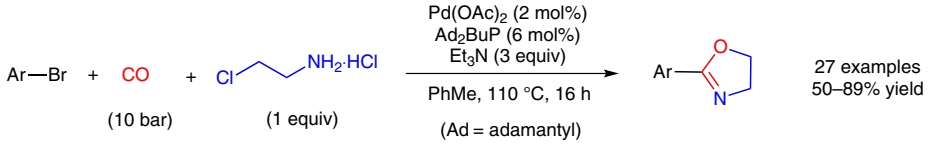
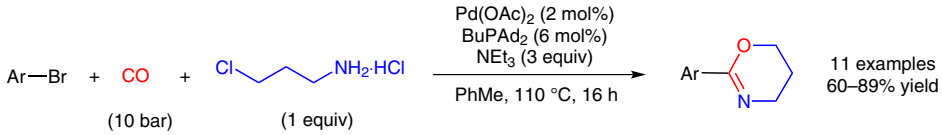
Palladium-Catalyzed Three-Component Synthesis of Oxazolines and Oxazines



Ar = Ph, Tol, 2-*i*-PrC$_6$H$_4$, 4-PhC$_6$H$_4$, 4-F$_3$CC$_6$H$_4$, 4-NCC$_6$H$_4$, 4-OHCC$_6$H$_4$, 4-Me(O)CC$_6$H$_4$, 4-*t*-BuO$_2$CC$_6$H$_4$, 4-*i*-Pr$_2$N(O)CC$_6$H$_4$, 4-FC$_6$H$_4$, 4-ClC$_6$H$_4$, 4-Me$_2$NC$_6$H$_4$, PMP, 3,4-(MeO)$_2$C$_6$H$_3$, 4-MeSC$_6$H$_4$, 1-Naph, 2-Naph, 6-MeONaph-2-yl, 2-thiophenyl, 3-thiophenyl, 3-benzo[*b*]thiophenyl, 3-py, 1-methyl-1*H*-indole-5-yl, 3-quinolinyl, 6-quinolinyl, 7-quinoxalinyl



Ar = Ph, 4-NCC$_6$H$_4$, 4-Me(O)CC$_6$H$_4$, 4-Me$_2$NC$_6$H$_4$, PMP, 4-MeSC$_6$H$_4$, 1-Naph, 3-thiophenyl, 3-benzo[*b*]thiophenyl, 3-Py, 1-methyl-1*H*-indole-5-yl

Significance: Described is the synthesis of oxazolines via a three-component process, in which readily available aryl bromides, carbon monoxide and 2-chloroethylamine undergo a palladium-catalyzed carbonylation and a subsequent cyclization to afford 2-aryloxazolines in good yield. Replacing 2-chloroethylamine with 3-chloropropylamine also works well and in this case the corresponding 2-aryloxazine derivatives are formed. Notably, both electron-donating and electron-withdrawing groups are tolerated in this process. However, the scope of the three-component process was not well investigated, especially for *ortho*- and *meta*-substituted aryl bromides.

Comment: Oxazolines and oxazoles are important heterocycles for organic synthesis and materials chemistry (see Book below). A number of methodologies for the construction of the oxazoline ring from aryl aldehydes, nitriles, carboxylic acids and related derivatives have been developed (e.g., S. Takahashi, H. Togo *Synthesis* **2009**, 2329). In comparison with those, the present carbonylation–cyclization strategy offers a straightforward way for the synthesis of oxazolines and their analogues from easily available starting materials. A drawback of this method is the high pressure required (10 bar).

Book: *Oxazoles: synthesis, reactions, and spectroscopy, Part 2*; D. C. Palmer, Ed.; Wiley: Hoboken, **2004**.

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