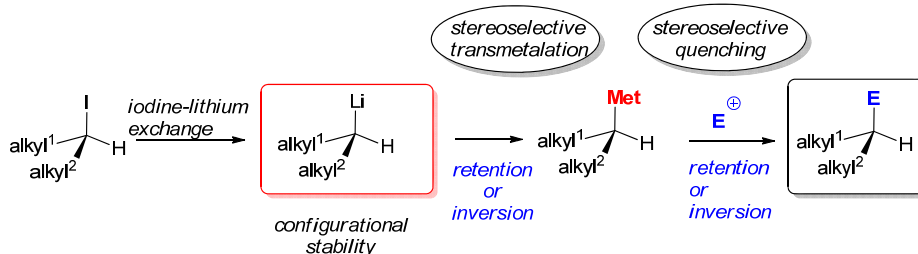


Polyfunctional Li-, Mg- and Zn-Organometallics in Organic Synthesis

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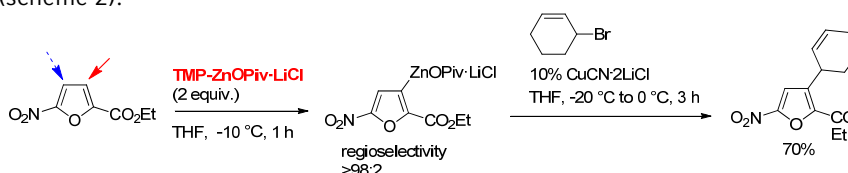


- First, we will describe a new general method for preparing chiral secondary alkyl lithium reagents using a stereoselective I/Li-exchange reaction. This chemistry will be used to prepare the natural occurring pheromone (-)-lardolure in a very predictive manner (Scheme 1).



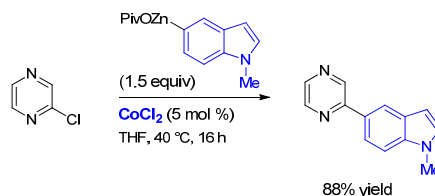
Scheme 1

- We will then describe new efficient direct insertion procedures of zinc to aromatic and heterocyclic halides and use these methods to prepare a range of polyfunctional organozinc reagents. By using a directed *ortho* C-H activation triggered by TMPZnOPiv, we will be able to prepare zinc reagents having an air- and moisture-enhanced stability and show their utility in organic synthesis (Scheme 2).



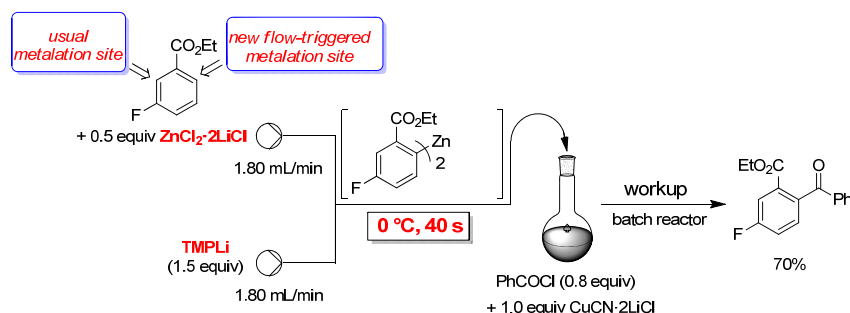
Scheme 2

- We will also report a new quite general cobalt-catalyzed cross-coupling procedure allowing the preparation of various unsaturated molecules. Notice that the catalyst used CoCl_2 is 1000 times cheaper than PdCl_2 generally used in cross-couplings (Scheme 3).



Scheme 3

- Finally, we will demonstrate that organozinc and organomagnesium reagents are compatible with various strong Lewis acids. This can be applied to achieve unusual metalations. The use of flow-technology further extends the reaction scope (Scheme 4).



Scheme 4

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