Title:	Metal-free C-C cross-coupling reactions using simple and cheap organic additives
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Abstract:	Transition-metal-catalysed reactions have been explored from the starting of the last century and illustrate an evolution in organic chemistry. Over the last 50 years, it becomes elegant and direct methods for C-C bond formation. 1 Many name-reactions have been designated in the text books and are familiar now days for instance, Heck coupling, Suzuki coupling, Negishi coupling, Stille coupling and several others. Great utility and importance of these metal catalyzed reactions were focused by the Noble Prize in the field of Chemistry in 2010. 2 However, transition-metal-catalysed coupling reactions have some limitations in terms of applications and difficulties. Firstly, most of these metal-catalysts are generally very costly. Secondly, a large number of transition-metal-catalysis are toxic to various proportions and removal of impurity from the required products is quite expensive and challenging, particularly for pharmaceutical industries. Finally, these catalysts are significantly oxygen and moisture sensitive. Transition-metal- catalysts are very difficult to handle. Certainly, suitable methods to form C-C bonds using without any metal to satisfy the common transition-metal-catalysed reactions are highly demanding. 3 This shows the excitement about the article of coupling of iodobenzene to pyridine derivatives without any transition-metal-catalysts by Itami et al. 4 in 2008. Since then several additives were reported for instance, 1,10-phenanthrolines, 1,2-diamines, 1,2-diols, N-methyl anilines, indoline derivatives are several others.
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