The development of a sustainable process for Sonogashira reactions in micellar media

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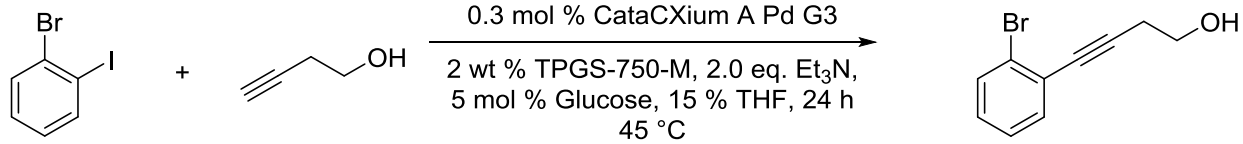
Cross-coupling reactions are amongst the most widely used reactions in the chemical industry. As resources are diminishing and sustainability becomes more and more important, new techniques and conditions must be developed to ensure chemistry for future generations. In this work, a sustainable process for Sonogashira cross-coupling reactions in micellar media was developed using the designer surfactant TPGS-750-M. As previous approaches towards the development of conditions for Sonogashira reaction in water had showed drawbacks like high temperature and expensive catalyst systems. Our approach was to examine new catalytic systems and examine their efficiency on demanding substrates. By screening ten different catalyst and experimenting with different additives we discovered that Degussa's CataCXium A, showed a high catalytic activity enabling a very low catalyst loading of 0.3 mol %, a high functional group tolerance, mild reaction conditions and simple workup procedures furthermore we discovered beneficial properties of glucose and THF when added to the reaction. In addition, we were able show that our developed process can be easily scaled up and can be used on a wide range of substrates with different chemical properties. In summary we have developed a general and simple procedure for Sonogashira reactions with a high potential for future applications in both academia and industry.



93 %
mono : double
1 : 0.04