SYNLETT
Spotlight 401

Copper(II) Acetate

Compiled by Mojtaba Amini

This feature focuses on a reagent chosen by a postgraduate, highlighting the uses and preparation of the reagent in current research

Mojtaba Amini was born in Abhar, Iran in 1982. He received his B.Sc. degree in pure chemistry in 2003 and then he completed his M.Sc. in the field of inorganic chemistry at the Sharif University of Technology in 2006. Currently, he is working towards his Ph.D. in inorganic chemistry at the Sharif University of Technology under the supervision of Prof. Mojtaba Bagherzadeh. His research interest is mainly focused on the synthesis of novel catalysts for the Heck and Suzuki coupling reactions.

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Dedicated to my supervisor Prof. Mojtaba Bagherzadeh.

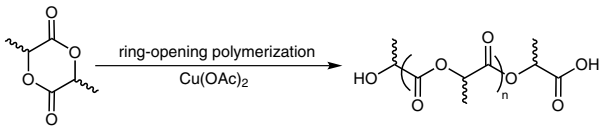
Introduction

Copper(II) acetate, or cupric acetate, is a dark green crystalline solid with the formula $Cu(OAc)_2$. X-ray measurements indicate that this compound is monoclinic with space group C2/c and unit-cell dimensions a = 13.15, b = 8.52, c = 13.90 Å.[1]

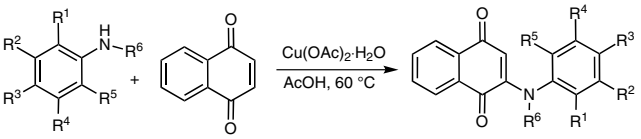
Copper(II) acetate monohydrate is produced by the reaction of copper(II) carbonate or copper(II) hydroxide with a solution of acetic acid or by the reaction of copper(II) oxide with hot dilute acetic acid. Copper(II) acetate is used as a textile dyeing, ceramic pigment and catalyst in organic reactions.[2]

Abstract

(A) Chakraborty and co-workers have developed a green method for the bulk ring-opening polymerization of lactides in the presence of $Cu(OAc)_2$ as a good catalyst to synthesize polymers with different end-terminal groups.[3] These polymerizations are highly controlled leading to the formation of polymers with the expected number of average molecular weights and narrow molecular weight distribution.

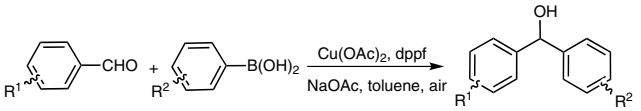


(B) Garden and co-workers have found that the oxidative addition of anilines with 1,4-naphthoquinone to give *N*-aryl-2-amino-1,4-naphthoquinones can be performed in the presence of catalytic amounts of copper(II) acetate.[4] All the reactions are generally more efficient in that they are cleaner, higher yielding, and faster.



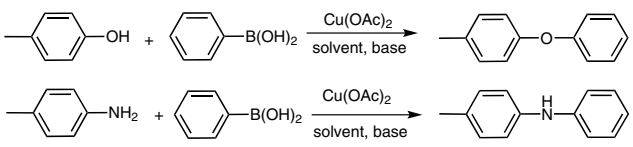
R^{1-5} = F, Cl, Br, I, Me, NH_2, OMe, CN, CO_2H, NO_2, CF_3; R^6 = H, Me

(C) Wu and co-workers have developed a novel copper-catalyzed protocol for the synthesis of carbinol derivatives.[5] In the presence of copper(II) acetate and dppf, carbinol derivatives were prepared by the addition of arylboronic acids to aromatic aldehydes in good to excellent yields.



R^1, R^2 = H, NO_2, CF_3, CN, CHO, CO_2Me, SO_2Me, MeO, Me, F, Cl, Br

(D) The reactivity of copper(II) acetate as catalyst in standard C–O and C–N coupling reactions has been developed systematically.[6]



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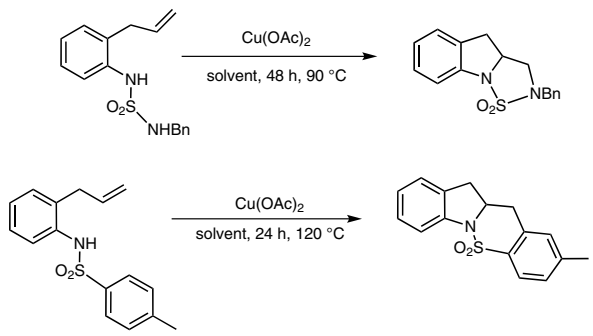
(E) Chemler and colleagues have found that $Cu(OAc)_2$ is an excellent promoter for the intramolecular diamination of olefins using sulfamide substrates[7] and oxidative cyclization of N-sulfonylated aromatic systems.[8]



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