

Fluoroform as a feedstock for valuable fluorinated compounds

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Trifluoromethylated building blocks and intermediates are in increasingly high demand for the synthesis of agrochemicals, pharmaceuticals, and specialty materials.¹ Readily available fluoroform (CHF₃), a side-product of the fluoropolymer and fluorochemicals industries and a potent greenhouse gas, is by far the best CF₃ source for trifluoromethylation reactions.^{1,2} However, chemoselective activation of highly inert fluoroform is exceedingly challenging. In recent years, a novel promising methodology has emerged for CHF₃ activation with transition metals. This presentation will focus on our contributions to the area (Figure 1), including (i) the first reactions of direct cupration¹⁻⁵ and palladation⁶ of fluoroform to furnish CuCF₃ and PdCF₃ complexes in nearly quantitative yield; (ii) the development of new, low-cost, highly efficient, and selective fluoroalkylation methods with our CuR_f (R_f = CF₃, C₂F₅) reagents prepared from CHF₃ and C₂F₅H;⁷⁻¹⁴ and (iii) remarkable mechanisms of the cupration of CHF₃⁵ and aromatic trifluoromethylation reactions with CuCF₃.^{15,16}

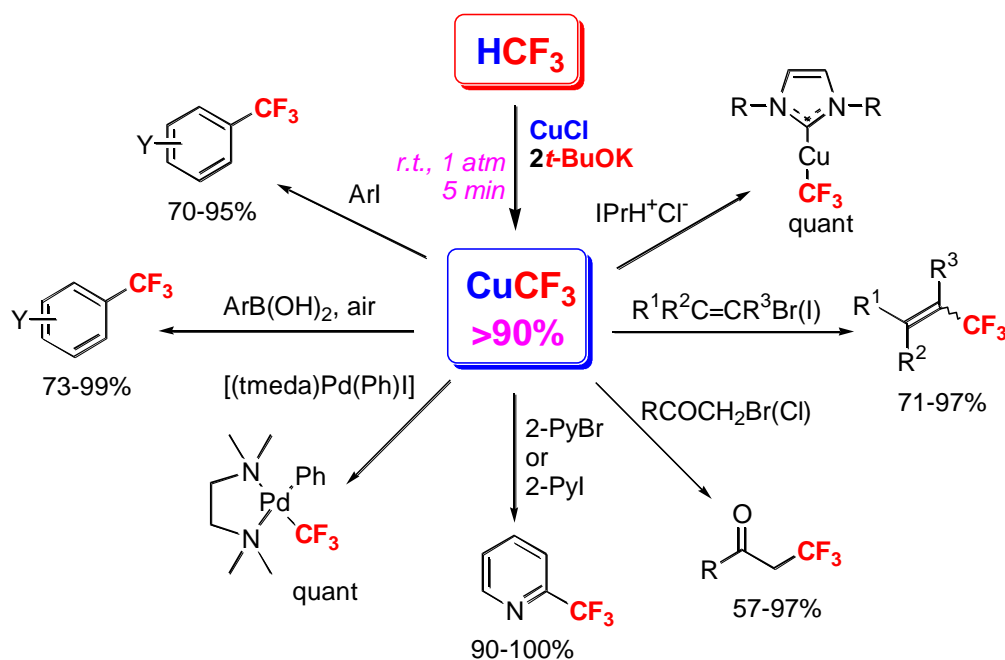


Figure 1. Direct cupration of fluoroform (CHF₃) and trifluoromethylation reactions with fluoroform-derived CuCF₃.

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