

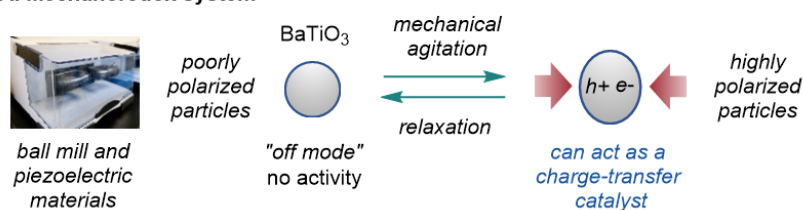
Mechanoredox C–H functionalization reactions

(¹*Division of Applied Chemistry, Graduate School of Engineering, Hokkaido University*, ²*WPI-ICReDD, Hokkaido University*) ○Yadong Pang,² Joo Won Lee,¹ Koji Kubota,^{1,2} Hajime Ito^{1,2}

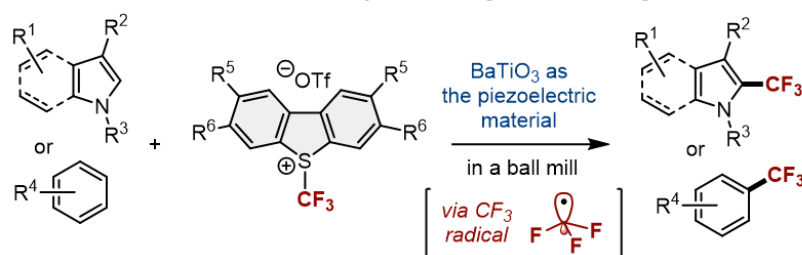
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Recently, we reported that agitation of piezoelectric materials *via* ball milling generates a temporary electrochemical potential that can reduce aryl diazonium salts to give the corresponding aryl radicals.¹ This mechanoredox system can be applied to arylation and borylation reactions under mechanochemical conditions. This approach may complement existing photoredox transformations because mechanoredox reactions can be carried out without the use of large amounts of dry and degassed organic solvents in air, and do not require special operating conditions. In this study, we have developed a C–H trifluoromethylation of aromatic compounds using a mechanoredox system.² This reaction presumably proceeds *via* the formation of trifluoromethyl radical, which is generated by a piezoelectric effect-induced single electron reduction of the Umemoto reagents, to yield trifluoromethylated aromatic compounds in good yield with high regioselectivity. Furthermore, we found that this mechanoredox system can be applied to a C–H arylation of aromatic compounds with diaryliodonium salts.

A. Mechanoredox system



B. Mechanoredox C–H trifluoromethylation using Umemoto reagents



C. Mechanoredox C–H arylation using diaryliodonium salts



1) K. Kubota, Y. Pang, A. Miura, H. Ito, *Science* **2019**, 366, 1500. 2) Y. Pang, J. W. Lee, K. Kubota, H. Ito, *Angew. Chem. Int. Ed.* **2019**, 59, 22570.