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Oxidative cross-coupling with selective C-O bond formation

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Oxidative cross-dehydrogenative coupling methodology lies in the modern trend of organic chemistry. It eliminates necessity for installation of additional functional groups and affords direct coupling in one stage (via selective C-H activation) with limited amount of wastes, high atom and step economy. Oxidative cross-dehydrogenative C-C coupling was studied in most detail; the C-N, C-P, and C-O cross-coupling reactions are less well developed. It is difficult to achieve high selectivity in the cross-dehydrogenative C-O coupling because the starting compounds are prone to side oxidation and fragmentation reactions giving, for example, alcohols and carbonyl compounds. This gives rise to a problem of searching for oxidizing agents and reaction conditions suitable for the cross-coupling of different types of substrates. We discovered oxidative cross C-O coupling of 1, 3-dicarbonyl compounds, their heteroanalogues and heterocycles with peroxides, oximes and hydroxyamides. The best results were obtained with the use of the widely available copper, iron, manganese or lanthanide salts as catalysts or oxidants.

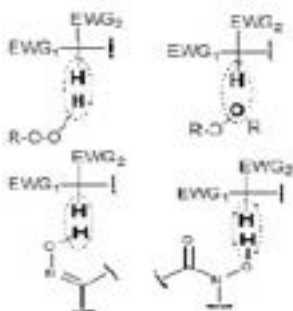


Figure 1



Figure 2

Recent publications

1. A O Terent'ev, I B Krylov, M Y Sharipov, Z M Kazanskaya and G I Nikishin (2012) Title Tetrahedron 68: 10263-10271.
2. A O Terent'ev, I B Krylov, V P Timofeev, Z A Starikova, V M Merkulova, A I Ilovaisky and G I Nikishin (2013) Title Adv. Synth. Catal. 355: 2375-2375.
3. A O Terent'ev, I B Krylov, V P Timofeev, B N Shelimov, R A Novikov, V M Merkulova and G I Nikishin (2014) Title Adv. Synth. Catal. 356: 2266-2280.
4. A O Terent'ev, I B Krylov and V A Vil' (2015) Title Beilstein J. Org. Chem. 11: 92-146.
5. A O Terent'ev, V A Vil', E S Gorlov, G I Nikishin, K K Pivnitsky and W Adam (2016) Title JOC 81: 810-823.

Biography

Alexander O Terent'ev has completed his MS in Chemistry of Biologically Active Compounds from D Mendeleev University of Chemical Technology of Russia, Moscow, PhD degree in 2000 and DSc degree in Organic Chemistry in N D Zelinsky Institute of Organic Chemistry RAS 2009. He worked as Professor in D Mendeleev University of Chemical Technology of Russia 2011. From 2016, he is working as Professor and Head of laboratory in N D Zelinsky Institute of Organic Chemistry RAS, Head of laboratory in All-Russian Research Institute of Phytopathology. His interests are Organic Chemistry, Medical and Agricultural Chemistry, Chemical Technology. He has published three chapters in books, 100 research papers, and 25 patents.

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