

## Development of Sustainable Organic Material Transformation

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Organic synthetic methodologies have become a quite important and indispensable social infrastructure technology. All kind materials in our society were produced by using some organic transformations. Unfortunately, most of organic reactions must use pre-functionalized starting materials to get the desired reactivity and selectivity. Due to this requirement, organic transformations have consumed a lot of materials, energy, and times. Hence highly practical and economic (atom, time, and redox) methods are strongly required.

In terms of step and time economics, oxidative material transformations are ideal methods for the synthesis of targeting molecule, albeit with low atom economy. If improvement of the atom-economics of that reaction by using atom-economic and/or sustainable oxidants such as molecular oxygen and hydrogen peroxide, oxidative functionalization would be a truly ideal transformation.

Recently, we succeeded highly practical and atom-economic C–H bond oxygenation by using newly designed non-heme-type ruthenium complex as a catalyst. The reaction with hydrogen peroxide as the terminal oxidant showed excellent reactivity and site-selectivity with wide substrate scope in C–H oxidation. To the best knowledge, highest turnover frequency and turnover number were observed.

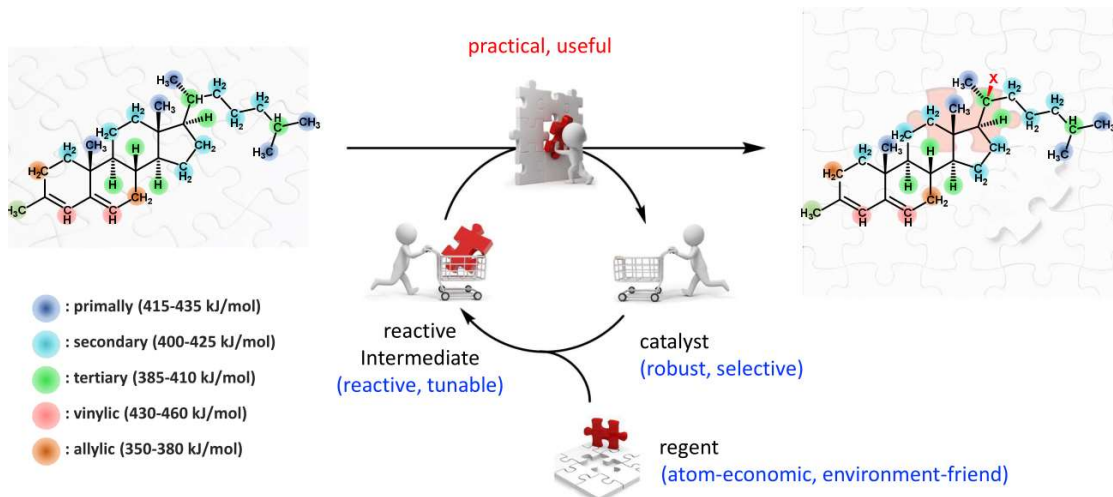


Figure 1. Research target.