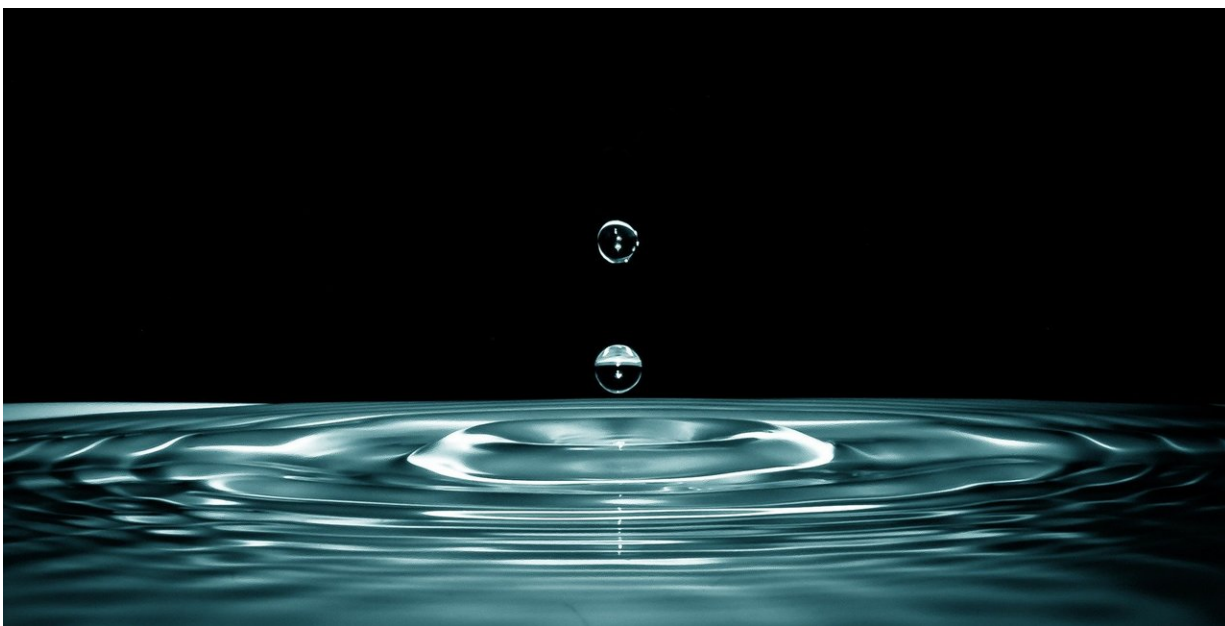


# Calcium-catalyzed reactions of element-H bonds

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Calcium (Ca) is one of the most abundant elements on Earth, and it is easily accessible and very cheap. In comparison with transition-metal elements, Ca is biocompatible and environmentally friendly. Therefore, reactions using Ca compounds show a good prospect for large-scale production and application. During the last decade investigations on organocalcium catalysis have been unfolding. Besides conventional Ca salts with strong electron-withdrawing counter anions that may serve as

Lewis acid catalysts, many Ca complexes have also been designed recently and found to be good catalysts, like transition-metal catalysts. Compared with the conventional inorganic bases such as NaOH and KOH,  $\text{Ca}(\text{OH})_2$  was uniquely active in some reactions. Owing to the great abundance, non-toxicity, and the biocompatible features of calcium, Ca-catalyzed reactions have many applications in industry.

On the other hand, the hydrofunctionalization reactions of element-H (including O-H, S-H, N-H, P-H, C-H, Si-H, B-H, H-H, etc.) are significant synthetic reactions. By using these reactions, the precise functionalization of organic compounds can be achieved without the generation of wastes. Thus, in line with calls for environment protection, the hydrofunctionalization reactions of element-H are good tools to improve the traditional synthetic procedures and reduce the damages of chemical production to the environment. The conventional hydrofunctionalization reactions usually employ transition-metal catalysts, such as Pd, Rh, Ru, Cu, Ni etc, which are expensive, toxic and unfriendly to the environment. Therefore, developing even cheaper, environmentally friendly catalysts to achieve the hydrofunctionalization reactions are of good practical value.

Recently, the organocalcium-catalyzed hydrofunctionalization reactions of element-H have been widely investigated and have been reported in a series of studies. Classified by the types of element-H, this short review summarizes the recent advances of organocalcium-catalyzed hydrofunctionalization reactions. The authors hope that it may provide a useful guide for interested readers from both the academy and industry.

**More information:** Lei Yu et al, Calcium-catalyzed reactions of element-H bonds, *Science Bulletin* (2018). [DOI: 10.1016/j.scib.2018.06.002](https://doi.org/10.1016/j.scib.2018.06.002)

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