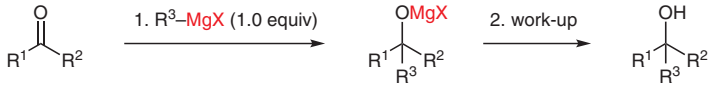
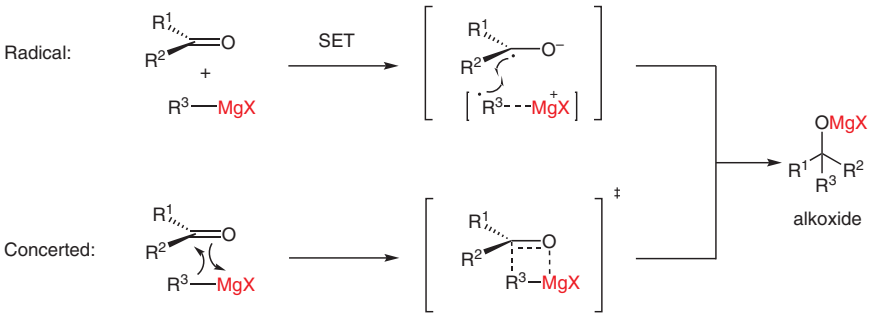
V. GRIGNARD (UNIVERSITY OF LYON, FRANCE)

Some New Organometallic Combinations of Magnesium and their Application to the Synthesis of Alcohols and Hydrocarbons
C. R. Acad. Sci **1900**, *130*, 1322–1324.

The Grignard Reaction



Mechanism of the Grignard reaction:



Significance: In 1900, V. Grignard reported the reaction of an alkyl halide with magnesium metal in diethyl ether leading to a cloudy solution of an organometallic compound (RMgX). Subsequent reaction with aldehydes or ketones, later named the Grignard reaction, afforded the corresponding alcohols. Grignard reagents have become an indispensable part of today's organic synthesis and they are widely used for carbon–carbon bond formations. As acknowledgement of this great discovery, V. Grignard was awarded with the Nobel prize in 1912.

Comment: The formation of the Grignard reagent proceeds most likely through a single-electron transfer (SET) mechanism and takes places on the metal surface. The mechanism of the addition of the Grignard reagent to the carbonyl group is not fully understood. However, it is thought that the reaction takes places via a radical (stepwise) or a concerted pathway forming the corresponding alkoxides.

Reviews: E. C. Ashby *Q. Rev. Chem. Soc.*, **1967**, *21*, 259-285; J. F. Garst, M. P. Soriaga *Coord. Chem. Rev.* **2004**, *248*, 623-652.

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