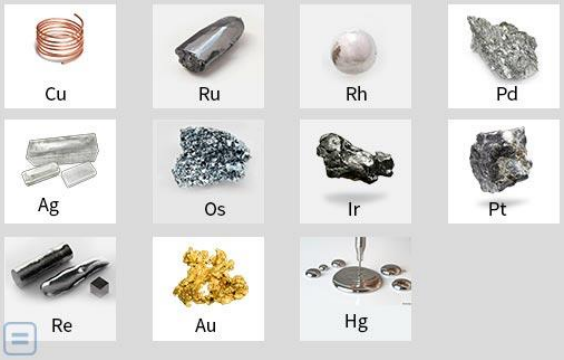
Noble Metal Catalysis for Organic Synthesis

Models/Topics Covered: Inorganic Reaction Mechanisms, Homogeneous Catalysis, Ligand Substitution, Redox

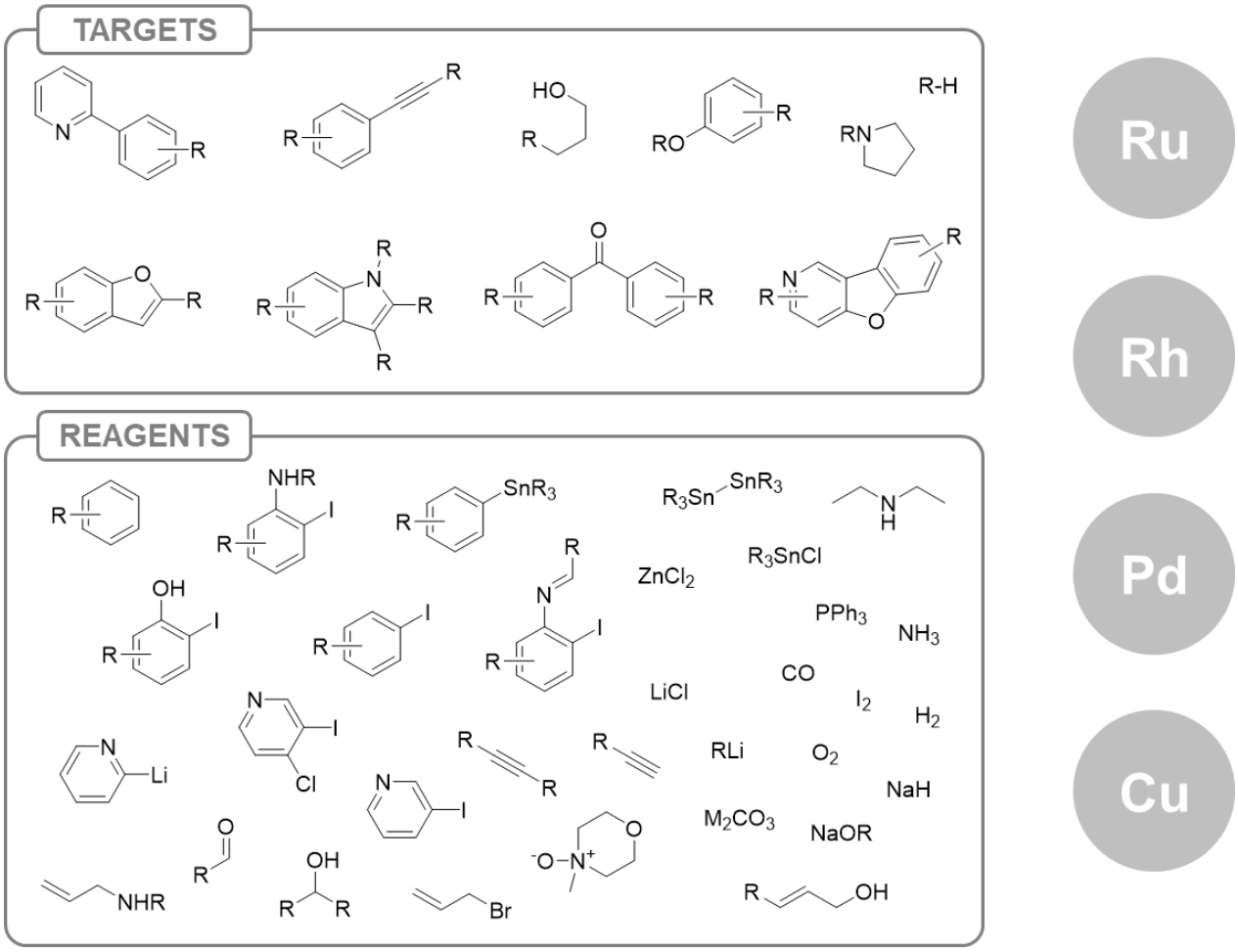
Noble metals are generally classified as those resistant to corrosion and are often found in nature in their pure form, including the platinum group and coinage metals. A broader definition (including the metals shown below, as well as Tc, As, Sb, Bi, Po) is sometimes used, based on the propensity of an element to react with acid and evolve hydrogen gas.



The Noble Metals. Reproduced from Ref[1].

Below are several target moieties that are accessible from the pool of reagents given with a noble metal catalyst and in an appropriate solvent. For each target, please provide:

(i). Reagents for a transformation to yield the target. Each target can be reached in a single step unless otherwise stated.
(ii). The noble metal(s) required to catalyse the transformation.
(iii). Where appropriate, the commonly used name of the transformation.
(iv). Mechanisms for these transformations.



[1] https://isequalto.com/iet-app/daily-edition/BPwm0190-Why-are-noble-metals-and-gases-called-%27noble%27?
[2] Kürti, Czakó. 2005. *Strategic Applications of Named Reactions in Organic Synthesis.* 1st ed. San Diego, USA: Elsevier Academic Press.