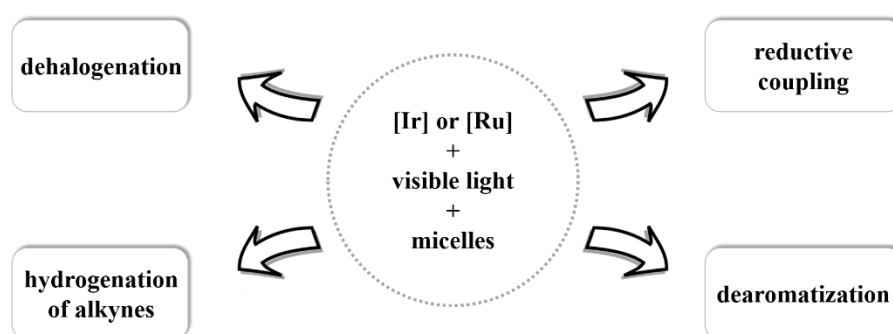


# Photocatalytic Reduction of Redox-Demanding Compounds in Microheterogeneous Solutions

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Although the number of applications of photoredox-driven reduction chemistry grows every year, the range of redox potentials that can be achieved using this methodology is still limited. On the cathodic site it reaches  $-2.4$  V vs. SCE - not enough to replace stoichiometric chemical reducing agents in numerous transformations such as Birch reduction, acyloin condensation, dehalogenation of electron rich aryl halides, aliphatic chlorides etc.<sup>[1]</sup>



*Figure 1. Visible light-induced, reductive transformations in microheterogeneous system*

The photocatalyzed reduction and reductive coupling of substituted haloarenes have been studied extensively in our group.<sup>[2,3]</sup> Herein we present the use of microheterogeneous solutions as a reaction medium for visible light-induced photoredox transformations catalyzed by transition metal complexes. These include the reactions of organic chlorides and bromides, but also non-halogenated substrates such as arenes and substituted alkynes. Compartmentalization of the reacting species and non-covalent interactions may lead to stabilization of the photoactive intermediates, inhibition of back-electron transfer processes and allow for redox-demanding reductions and reductive couplings, either in monophotonic, or biphotonic manner.<sup>[4]</sup> The use of aqueous mixtures in chemistry brings also other advantages. It can minimize the generation of solvent waste and provide easy separation of the products.

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