



Photoactive N-Heterocyclic Carbenes: Synthesis and unconventional Reactivity

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Context and state-of-the-art. Beyond their extensive applications in different areas of chemistry and homogeneous catalysis,^[1] **N-heterocyclic carbenes** (NHCs) have recently become key components in the design of highly efficient luminescent transition metal complexes.^[2] By contrast, photo-induced transformations of free NHCs are extremely rare and require high-energy UV irradiation.^[3] Furthermore, no viable examples of free carbenes with luminescent properties have been reported in the literature.

Research objectives. Our team has recently developed a synthetic approach to the imidazolium salts incorporating conventional organoboron and transition metal chromophores in the ligand backbone (see the scheme below). Upon deprotonation these compounds can be transformed to the first examples of stable luminescent imidazol-2-ylidenes showing a strong absorption in the visible region. The main aim of this internship is to explore the **unprecedented photo-induced reactivity** of these unique species towards the activation of small molecules and inert chemical bonds. Regular imidazole-based NHCs remain completely inefficient in such processes and an ultimate goal of the project consists in development of new photocatalytic transformations that are useful for organic synthesis.

