

# Electro- and photocatalysis by the family of Metal-Mabiq complexes

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The development of molecular electro- and photocatalysts is integral to the advancement of renewable energy technologies and sustainable chemistry methods. Our own work in this area involves studies with a series of late, first-row transition metal complexes coordinated by the bioinspired Mabiq ligand. The Co- and Fe-Mabiq complexes are effective electrocatalysts for H<sub>2</sub> evolution and CO<sub>2</sub> reduction. The reactions proceed via ligand-assisted pathways, in which the Mabiq ligand acts as both an electron and proton storage site. The series of metal-Mabiq complexes also exhibit unique photochemical properties that allow their application in photoredox catalysis. The M<sup>2+</sup>-Mabiq complexes can all be photochemically reduced to the formal M<sup>1+</sup>-Mabiq forms, while several of the M<sup>3+</sup>-Mabiq compounds can undergo visible light induced homolysis. Consequently, our Ni- and Co-Mabiq complexes can promote a range of light-driven C-C and C-N bond forming reactions. We also have recently synthesized a series of homo- and hetero-bimetallic Mabiq complexes, including mixed 3d/4f compounds. The binuclear systems offer further opportunities to tune the redox properties and photochemical behavior of our complexes, and to enhance their catalytic properties.

