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**INSTITUTT:** Kjemisk institutt  
**FAGOMRÅDE:** Metallorganisk/materialkjemi  
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**AVHANDLINGENS TITTEL:** *Cyclometalated Ruthenium(II) Complexes and their Incorporation into the Metal-Organic Framework UiO-67 for Photocatalytic CO<sub>2</sub> Reduction*

Two of the biggest challenges for the world today are the global warming, partly resulting from the increased CO<sub>2</sub> emissions, and the need of new energy sources due to an increasing world population and the necessary replacement of fossil fuels. The capture and transformation of CO<sub>2</sub> into high energy containing chemicals could contribute to both of these challenges.

In this PhD thesis, a type of porous materials is developed and studied with the aim of such CO<sub>2</sub> utilization. These materials are called metal-organic frameworks (MOFs) and can be readily functionalized by a wide range of chemical species. New, cyclometalated ruthenium(II) complexes were synthesized and incorporated into the MOF UiO-67 by different synthetic methods. These complexes and the corresponding functionalized MOFs were found to intensely absorb visible light. The MOFs were also tested for photocatalytic CO<sub>2</sub> reduction, in which the reduction products carbon monoxide, methanol, and formic acid were observed.