



## **Master Thesis in Visible Light Activated Molecular Switches** **(30 or 60 credits)**

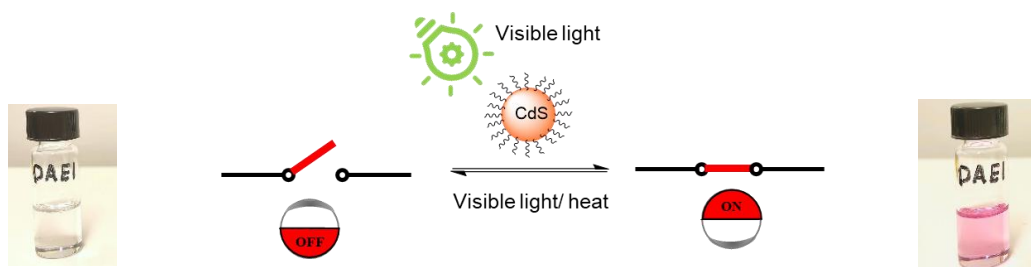
### **Objective of the project**

- Developing visible light activated molecular switches, sensitized by quantum dots through triplet state energy transfer.
- Studying the switching and sensitization mechanism using various optical spectroscopy techniques.

### **Description of the project**

Molecular switches<sup>1</sup> with the switching functions at the molecular scale (few nano meter) are the key elements to build artificial molecular machines and molecular-scale electronics.<sup>2</sup> However, to induce photo switching in many classes of molecular switches, UV light is required, which has a short penetration depth and can induce unwanted damaging photochemistry. Here we will drive molecular switches using visible light irradiation by combining with CdS quantum dots (QDs)<sup>3</sup> as triplet state sensitizers.

The research project will include synthesis and characterization of CdS quantum dots, and study visible light switching functions combined with molecular switches. This project holds a great potential to further develop all-visible-light activated optoelectronic devices and memories.



### **During the project, you will learn**

- Problem-solving capability, oral communication and written skills
- Gain a solid background in Physical Chemistry
- Synthesis and characterization of quantum dots
- Spectroscopic skills, including fluorescence, laser spectroscopy, etc.

**Interested? Please contact us for further information!**

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#### Reference:

1. Feringa, B. L., *Molecular switches*. Wiley-VCH: Weinheim; Chichester, 2001.
2. Xiang, D., Wang, X., Jia, C., Lee, T., Guo, X., Molecular-Scale Electronics: From Concept to Function. *Chem Rev* 2016, 116 (7), 4318.
3. Alivisatos, A. P., Semiconductor clusters, nanocrystals, and quantum dots. *Science* 1996, 271 (5251), 933.