Invitation à la soutenance publique de thèse de
Vanessa Kristina SEILER
Master of Science (chemistry)
Pour l’obtention du grade de Docteur en sciences

« Exploring merocyanine forms of spiropyran in the solid state
- A crystal engineering approach »

qui se déroulera
le mardi 17 décembre 2019 à 15h
Auditoire LAVO 51
Place Louis Pasteur, 3
1348 Louvain-la-Neuve

Spiropyran is a photochemically active compound exhibiting their
photochromic character primarily in solution. The breaking of the
central spiro C-O bond upon irradiation with UV-light leads via a
ring-opening isomerization to the open-form isomer called
merocyanine. The isomers have strongly different absorption
characteristics easily observable by their altered color. However, due
to high steric demand during the isomerization the photochromic
properties are not readily accessible in the solid state. Accessing the
merocyanine in the solid state can open up a pathway for multiple
color-based applications. Up to now, this was solely achieved by
chemical modification and by introducing complex host materials.
A crystal engineering approach as presented in this work provides a
promising alternative to explore the merocyanine isomer in the
solid state. The modification of the crystal structure is realized by
introducing a second component in order to stabilize the
merocyanine form and prevent the reverse isomerization. In doing
so, several inorganic and organic acids were applied in an
acidochromic approach successfully leading to the highly colored
solid materials. The variety of accessible solids of the target
molecule is expanded by metal-organic complexation and
salification with metal salts. Intermolecular interactions such as
hydrogen and halogen bonding support the tuneability of the
chromic properties in the solid state. Multi-component
spiropyran/merocyanine materials are obtained by isothermal
solvent evaporation and by mechanochemical synthesis. A full
characterization is provided by single crystal/powder X-ray
diffraction, solid state absorption spectroscopy, thermogravimetric
analysis (TGA) and nuclear magnetic resonance (NMR). The results
reveal how the tools of crystal engineering can be successfully
applied to access the photochromic properties of spiropyran in the
solid state.

Jury members:
Prof. Tom Leyssens (UCLouvain), supervisor
Prof. Yann Garcia (UCLouvain), chairperson
Prof. Yaroslav Filinchuk (UCLouvain), secretary
Dr. Koen Robeys (UCLouvain)
Prof. Johan Wouters (UNamur, Belgium)
Prof. Martin Schmidt (Goethe University, Germany)
Prof. Benoît Champagne (UNamur, Belgium)