

Invitation à la soutenance publique de thèse

Pour l'obtention du grade de Docteur en Sciences

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**Master Sciences, Technologies, Santé, à finalité professionnelle
Mention chimie, spécialité matériaux et entreprises**

Challenges in Cocrystallization of Chiral Compounds: Cocrystals of Amino Acids and Profens

Cocrystals are of interest to pharmaceutical industry as they allow varying pharmacological properties of drugs. Moreover, owing to some specific properties, cocrystals can be used in other crystallization applications, e.g., as a purification tool or for chiral resolution. Since a substantial part of drugs is chiral, the question how they respond to cocrystallization with chiral or nonchiral co-formers is a hot topic for pharmaceutical industry.

In this work we focus on amino acids as potential co-formers for chiral drugs, studying the fundamental aspects of cocrystallization, *i.e.* how the zwitterionic nature of amino acids affects the structural aspects of cocrystallization, the role of chirality and its influence on the cocrystallization outcome.

Working on naproxen/proline cocrystals, we established that amino acids are the most efficient co-formers when cocrystallized with compounds that contain a carboxylic group. In the second part of this work, we studied flurbiprofen/proline system, cocrystallizing various combinations of enantiopure as well as racemic forms of the initial compounds. Flurbiprofen is a non-steroidal anti-inflammatory drug. Proline is an amino acid widely used as a cofomer for various applications. Combining enantiopure and racemic flurbiprofen and proline, we discovered 18 new crystal structures. A unique combination of state-of-the-art characterization techniques, comprising variable temperature *in situ* X-ray diffraction and *in situ* ball-milling, along with other methods and DFT calculations, was indispensable for identifying all the phases.

The results of this work can be of interest to pharmaceutical industry as they deal with real drugs and important aspects of cocrystallization and chirality, essential for the development of various pharmaceutical applications of cocrystals.

Jeudi 7 septembre 2017 à 10h00

Auditoire LAVO 51
Bâtiment Lavoisier
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Membres du jury :

Prof. Tom Leyssens (UCL), promoteur
Prof. Jacques Devaux (UCL), président
Prof. Yaroslav Filinchuk (UCL), secrétaire
Prof. Johan Wouters (UNamur)
Prof. Geoffroy Hautier (UCL)
Prof. Franziska Emmerling (BAM, Bundesanstalt für Material for schung und-
prüfung, Allemagne)