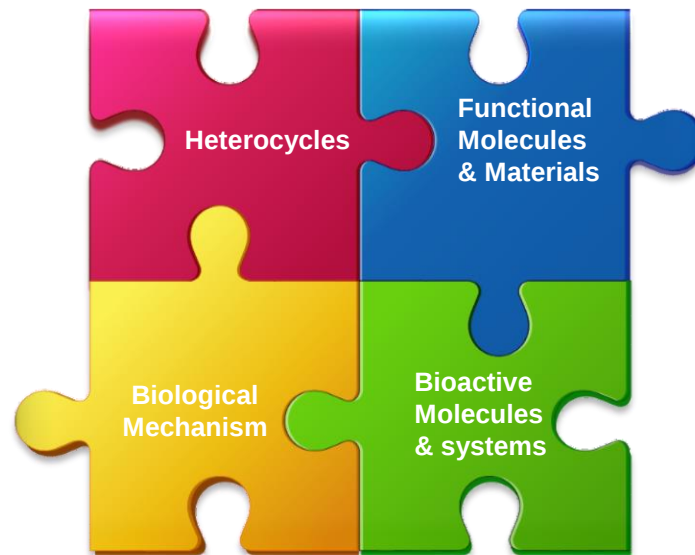


Graphene Quantum dots for energy applications:

Laboratoire Lorrain de Chimie Moléculaire (L2CM)

Dr. Philippe PIERRAT

- UMR 7053, Metz/Nancy
- CNRS / Université de Lorraine
- Organic synthesis, nanoparticles
- One person of the lab implicated in the GDR (coll. with other researchers of LCPA2MC)



AXEs
Élaboration
Mesures de propriétés
Mesures de performances de dispositif



N A M e

GDR Nanomaterials for Energy Applications

ELABORATION
MEASUREMENTS & METROLOGY
SIMULATIONS & THEORY
APPLICATIONS



Graphene Quantum dots for energy applications

- Our lab is specialized in organic synthesis of photosensitive molecules, organometallic complexes or nano-assemblies.
- Recent project toward the synthesis of graphene quantum dots for energy conversion
 - photon to electron
 - electron to photon
- What kind of applications are targeted ?
 - Energy storage (batteries, supercapacitors)
 - Photovoltaic devices
 - Luminescence (captors, sensors, imaging)
- **Project supported by SATT-Sayens**
- **Main goal:**
Develop a scalable synthetic process to evaluate their applications

Porteurs d'énergie

Electron

Photon

Type de conversion d'énergie

Photovoltaïque

Application relative à l'énergie ou autre

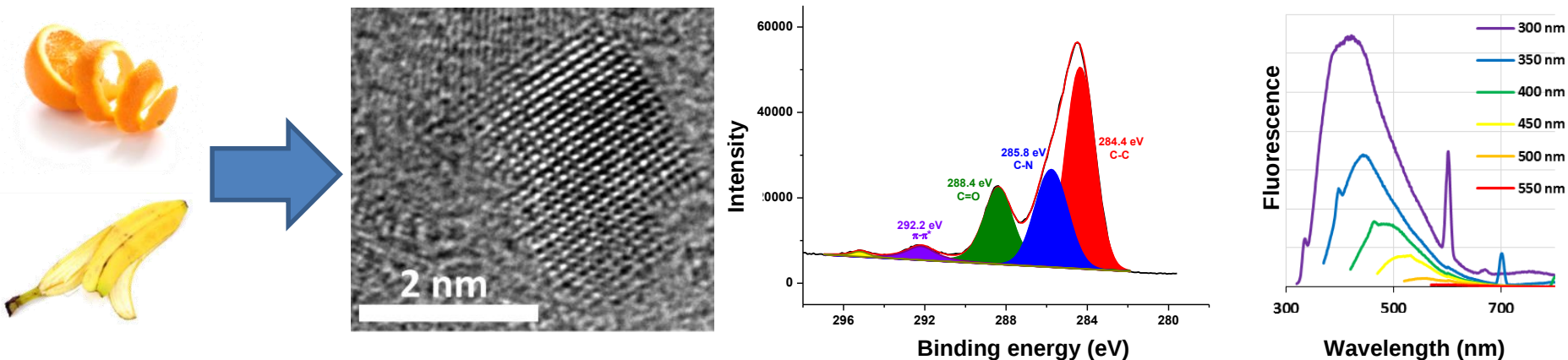
Récupération

Stockage

Capteurs

Imagerie

Graphene Quantum dots for energy applications



- **Top-down synthesis** from various biomass wastes (banana, oranges,...).
 - Size characterization (DLS, TEM, cryo-TEM)
 - Chemical characterization (XPS, IR, NMR)
 - Photophysical characterization (UV-vis, fluorescence)
 - Crystallized few nanometers objects (2-5 nm) with intrinsic fluorescence features
- **Looking for collaborations to evaluate the applications of this fascinating and new class of carbon-based nanomaterials**