



Functional Small Organic Molecules

Preferred Topics

HORIZON-CL4-2023-RESILIENCE-01-32: Bioinspired and biomimetic materials for sustainable textiles (IA)

HORIZON-CL4-2023-RESILIENCE-01-33: Smart sensors for the Electronic Appliances market (RIA)

HORIZON-CL4-2023-RESILIENCE-01-34: Advanced (nano and bio-based) materials for sustainable agriculture (RIA)

Materials Center:

- Established in 2018 at the Institute of Technology and Business in České Budějovice.
- Vast experience in design, functionalization and synthesis of small organic molecules.
- Property tuning of small organic molecules and solvent systems (optical, electrical, supramolecular arrangement, solubility, synthetic economy).
- Qualitative and quantitative analysis and determination of organic substances.
- Scientific activities directed towards articles, patents, and industrial applications/needs.
- Well-experienced and internationally recognized research team.

Technical Equipment

- Fully equipped laboratory of organic synthesis.
- Bench-top NMR.
- GC/MS system equipped with several columns (both quality and quantity).
- Absorption and emission spectroscopy.
- Thermogravimetric analysis.
- A unique interconnection of TGA and GC/MS systems (combustion products detection and determination).

Principal Application Areas of Developed Organic Materials:

- Tailoring of organic materials mostly towards organic electronics.
- Principal materials for OLEDs, OFETs, light conversion agents, NLO, bioimaging (especially via two-photon absorption), etc.
- Switching molecules, fluorescent systems capable to sense various analytes and biologically relevant receptors, organic scintillators, etc.
- Materials with aggregation-induced emission or thermally-activated delayed fluorescence.
- Design and development of monomers for advanced polymeric materials.
- Organic coatings.

Current Collaborators and Industrial Partners:

- University of Pardubice, University of Defence, Czech Technical University in Prague, Masaryk University, Charles University, Aalto University.
- Nuvia Czech Republic, EKAZ Praha, PPO Group Znojmo, Synpo Pardubice.

Recent Review Articles:

- Quaternary Ammonium Compounds: Simple in Structure, Complex in Application. *Top. Curr. Chem.* **2019**, 377, 14.
- Development and Application of Non-conventional Luminophores with Aggregation Based Emission. *Dyes Pigm.* **2022**, 205, 110354.
- Thienothiophene Scaffolds as Building Blocks for (Opto)Electronics. *Organics* **2022**, 3, 446.

Contact:

Prof. Ing. Filip Bureš, Ph.D.

(Czech leading scientist in the field of tailored organic and organometallic materials directed towards manifold applications. Scientific outcomes: 150 articles, 1 patent, 2700 citations, H-index 32; (co)PI of >20 projects including GACR, TACR, M-ERA.NET, ERC, OP VVV, ERDF).

Material Center, Environmental Research Department, Institute of Technology and Business in České Budějovice

E-mail: buress@mail.vstecb.cz