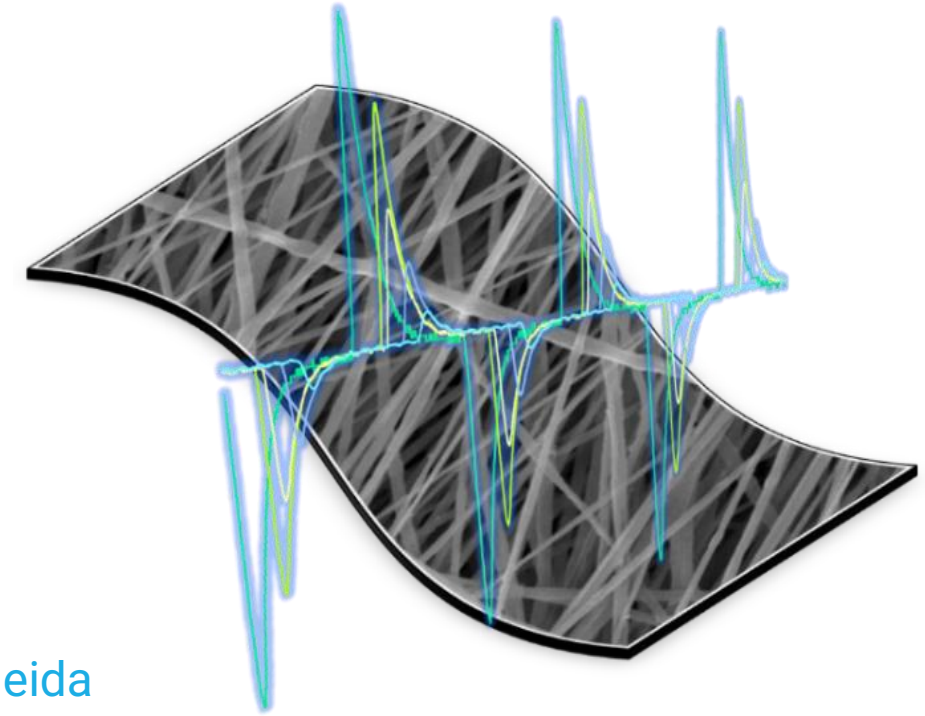
FUNCTIONALIZED NANOFIBERS FOR ENERGY HARVESTING AND NONLINEAR OPTICS



Rosa M. F. Baptista, Daniela Santos, Adelino Handa, Gonçalo Moreira, Luís ferreira, Etelvina de Matos Gomes, Michael Belsley, Bernardo Almeida

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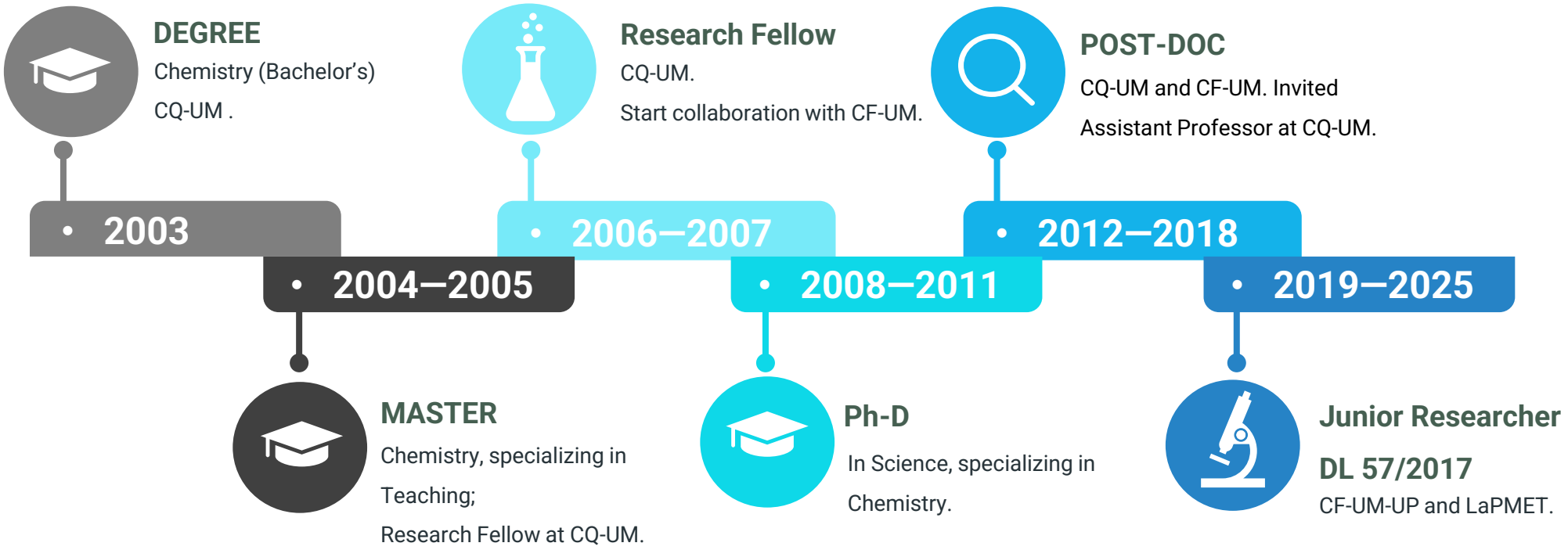
CV timeline


DEGREE
Chemistry (Bachelor's)
CQ-UM .
2003
Research Fellow
CQ-UM.
Start collaboration with CF-UM.
2006—2007
POST-DOC
CQ-UM and CF-UM. Invited
Assistant Professor at CQ-UM.
2012—2018
2004—2005
MASTER
Chemistry, specializing in
Teaching;
Research Fellow at CQ-UM.
2008—2011
Ph-D
In Science, specializing in
Chemistry.
2019—2025
Junior Researcher
DL 57/2017
CF-UM-UP and LaPMET.

Clarivate

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86 Publications indexed in Web of Science

78 Web of Science Core Collection publications

1,637 Sum of Times Cited

24 H-Index

ORCID

126 Validated works

56 Papers (**28** first author)
2 Papers in preparation
4 Papers submitted
16 Proceedings
55 Posters
22 Oral Presentations
8 Presentations in Electronic format
2 Book Chapters
14 scientific supervisions (last 6 years)

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Scopus

Baptista, Rosa M.F.

Universidade do Minho, Braga, Portugal 7005315184

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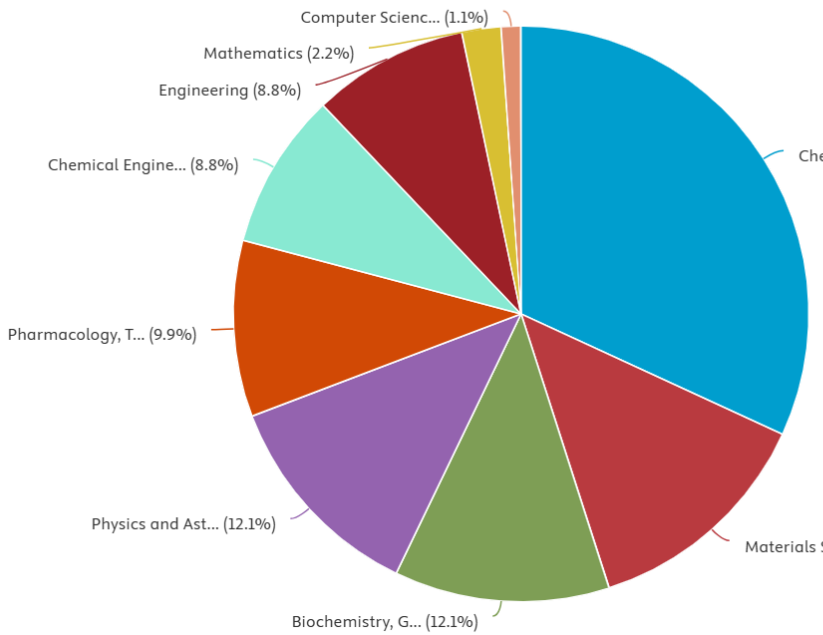
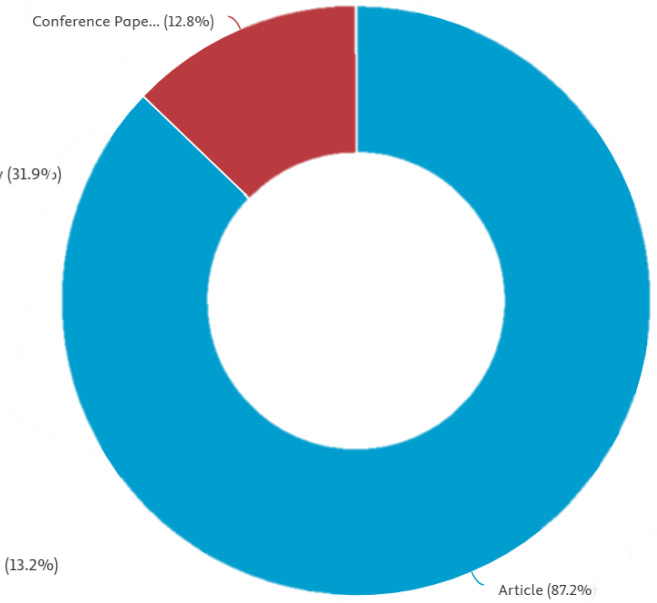
39 Documents

24 *h*-index

Documents by subject area

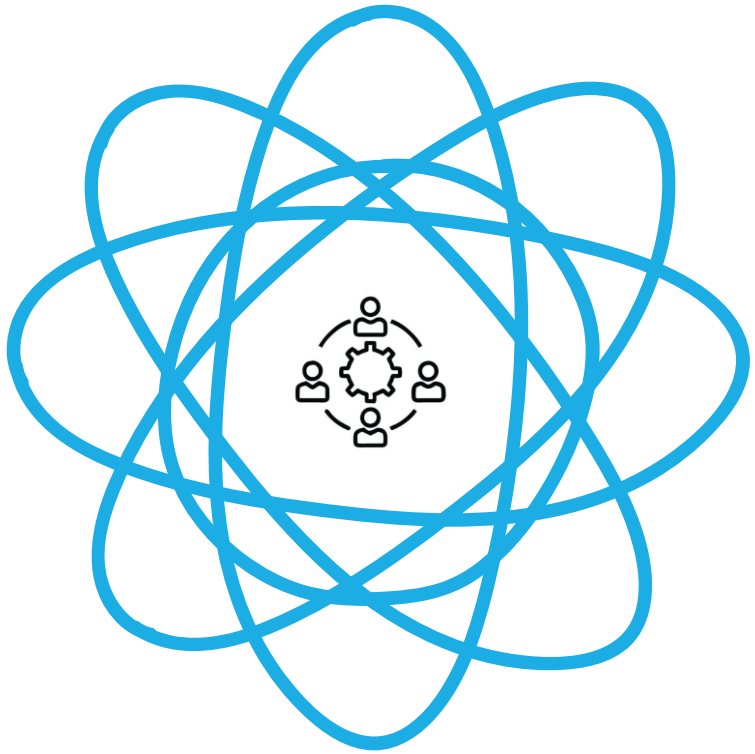


Documents by type



Research

Collaborators



Institute of Polymers and Composites (UM)

Ana Vera Machado

Centre of Biological Engineering (CEB-UM)

Nuno Cerca

NOVA School of Science and Technology (NOVA UL)

Clara S. B. Gomes

Centre for Environmental and Marine Studies (CESAM-UA)

Goreti Pereira

INEB and FEUP (UP)

Maria P. Ferraz

Instituto Superior Técnico (UL)

Ana Luísa Rodrigues

Laboratory for Instrumentation and Experimental Particle Physics (LIP-UL)

João Gentil

Centro de Biologia Molecular e Ambiental (CF/CBMA-UM)

Marlene Lúcio

International Iberian Nanotechnology Laboratory

Francis Leonard Deepak

Institute of Physics for Advanced Materials, Nanotechnology and Photonics (IFIMUP-UP)

João Pedro Esteves de Araújo

Aveiro Institute of Materials (UA)

Indrani Coondoo; Cristina Neves
Filipe Paz

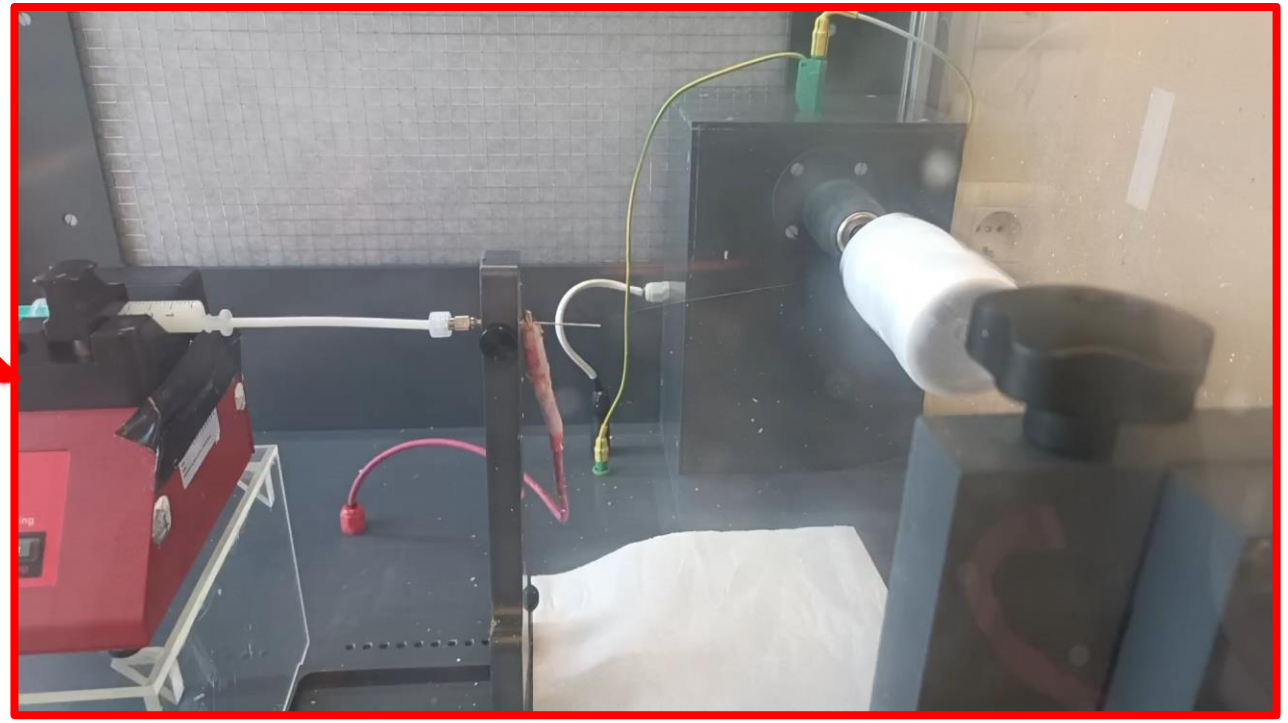
Centre of physics, Universidade Federal do Ceará

Alejandro P. Ayala

Department of Chemistry, University of Oslo

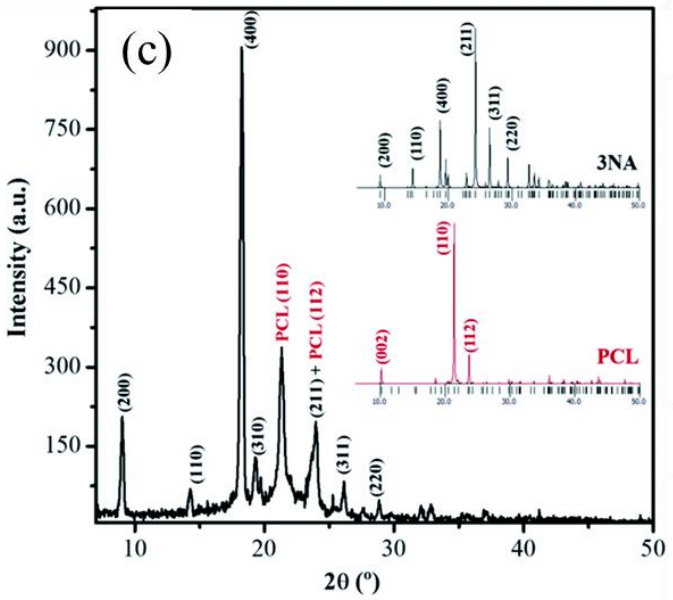
Carl Henrik Görbitz

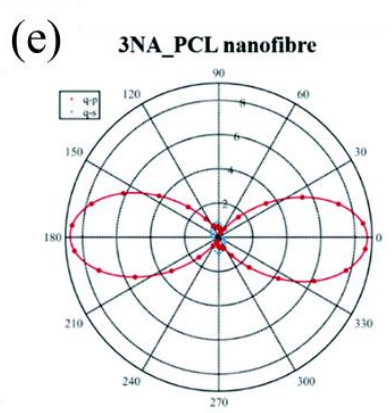
ELECTROSPINNING EQUIPMENT (E-FIBER EF100)

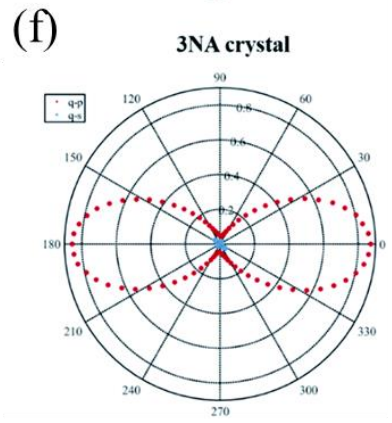


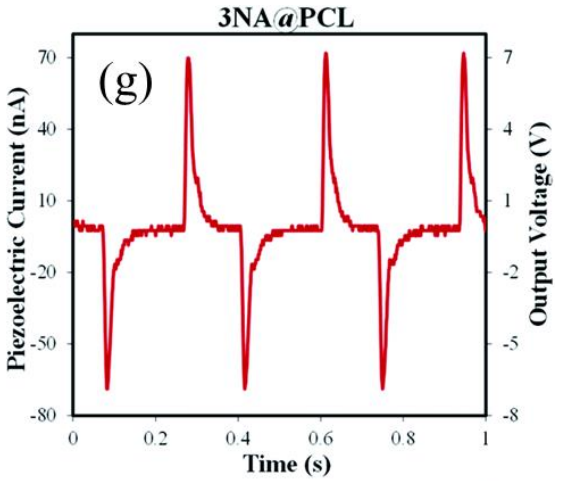
NANOFIBERS EMBEDDED WITH NONLINEAR NITROANILINE NANOCRYSTALS

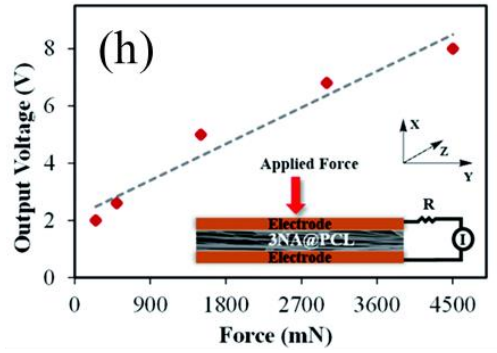
- ✓ nonlinear optical response: 80 pm V^{-1}
- ✓ piezoelectric current: 70 nA;
- ✓ Density power: 122 nW cm^{-2}

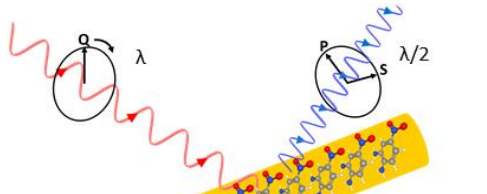




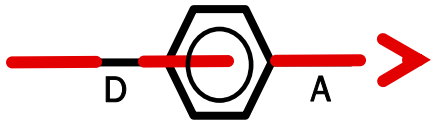




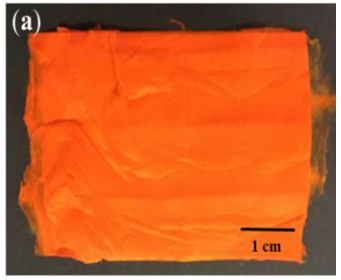


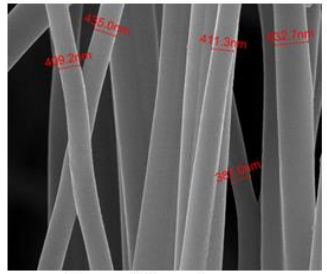


2A4NA@PLLA nanofiber
SHG emitter



$$D^{+} - \pi - A^{-}$$



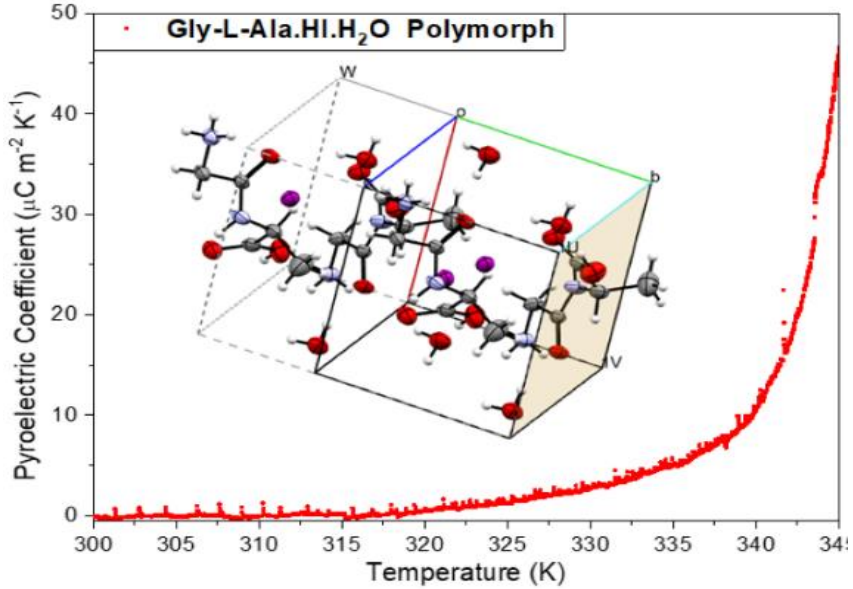


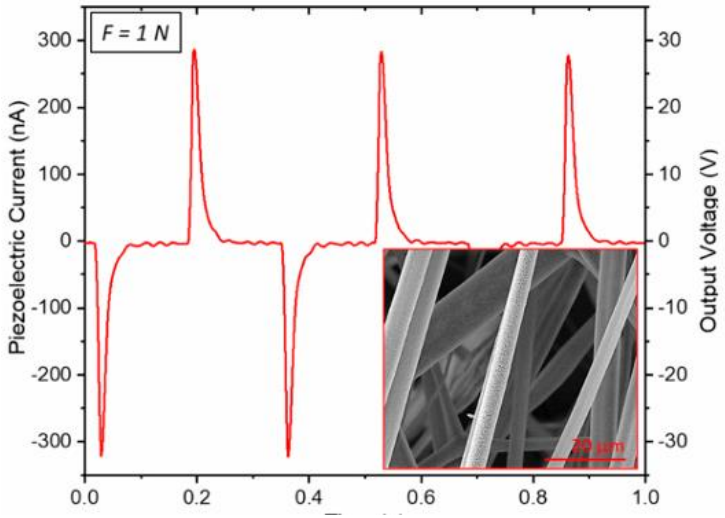
Nanofiber Array

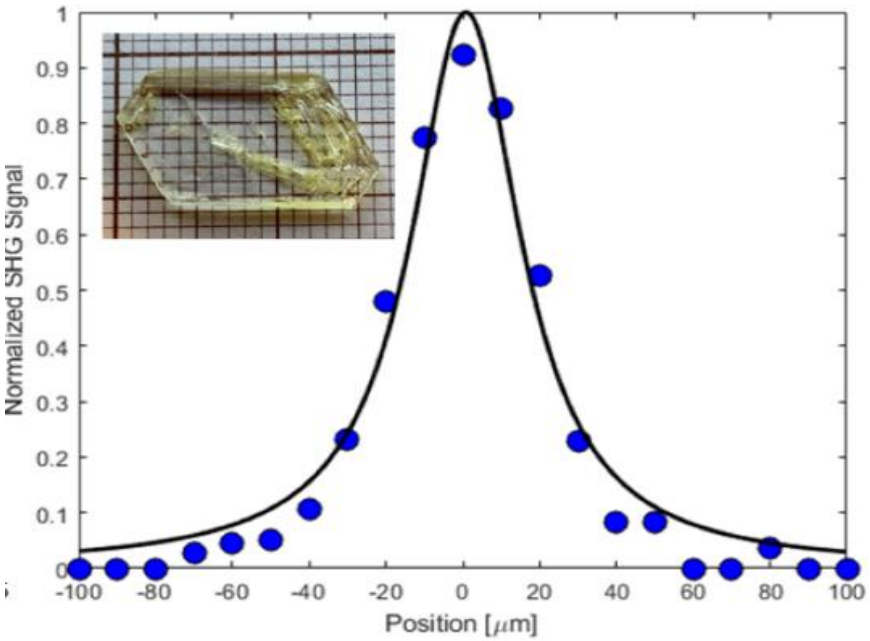
Bernardo, C. R., et al., *Nanoscale Advances* **2020**, *2*, 1206.
Baptista, R. M. F., et al., *Opt Mater* **2021**, *116*, 111089

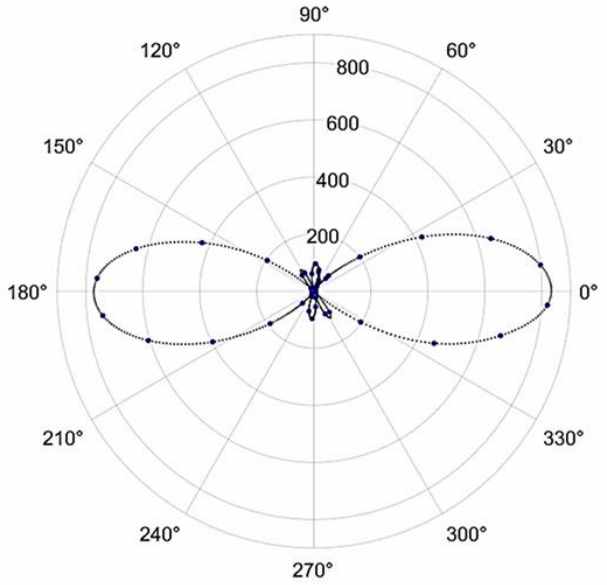
SYNTHESIS AND CHARACTERIZATION OF NEW CRYSTALS

- ✓ pyroelectric
- ✓ piezoelectric
- ✓ nonlinear optical properties





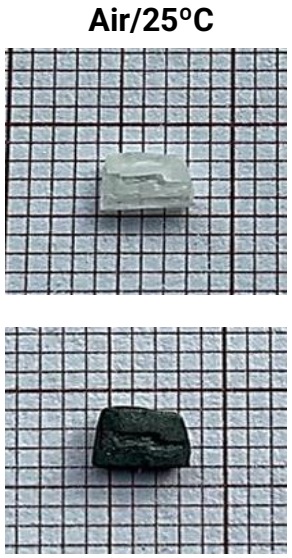


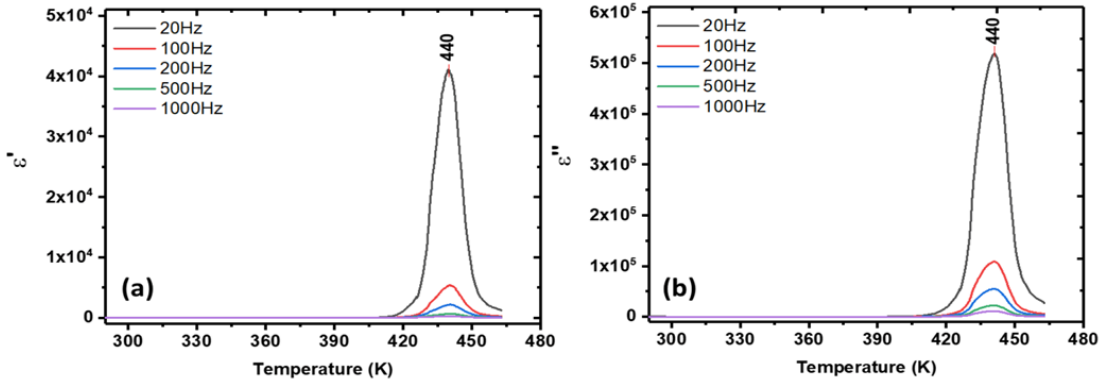


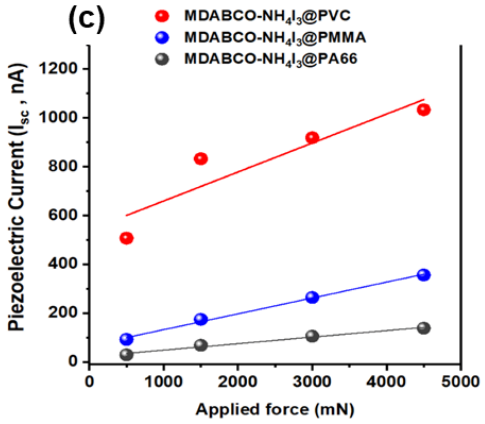
Baptista, R. M. F., et al, *Materials* **2023**, *16*, 3690.

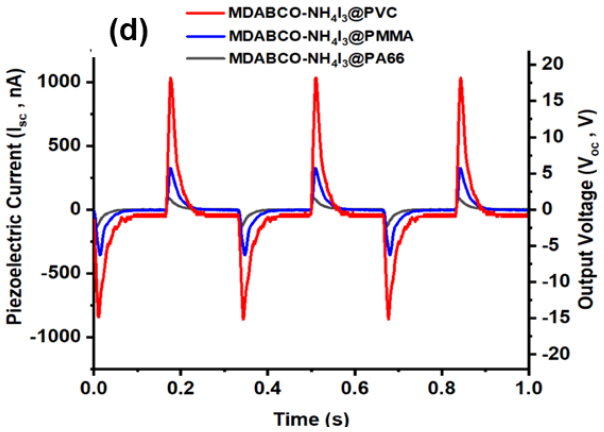
SYNTHESIS AND CHARACTERIZATION OF NEW CRYSTALS

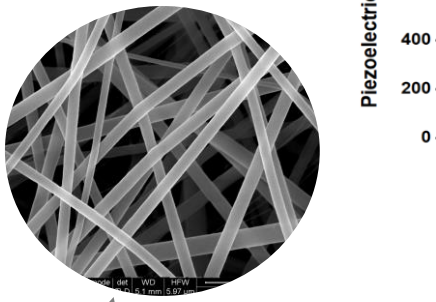
- ✓ Pyroelectric
- ✓ Piezoelectric
- ✓ Ferroelectric

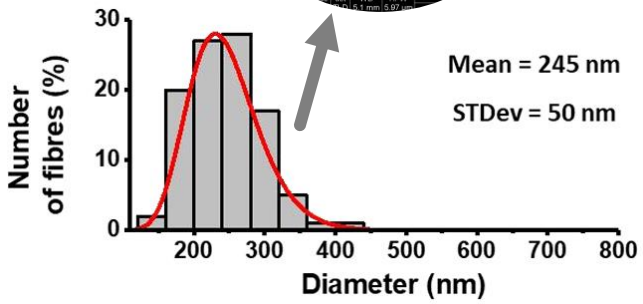


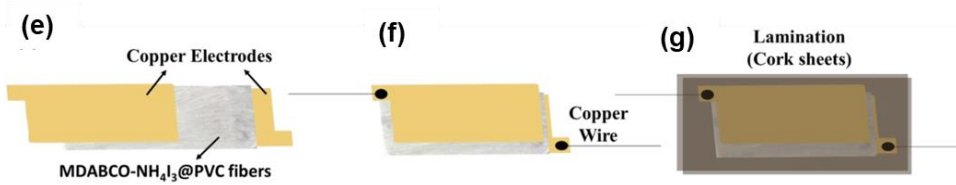








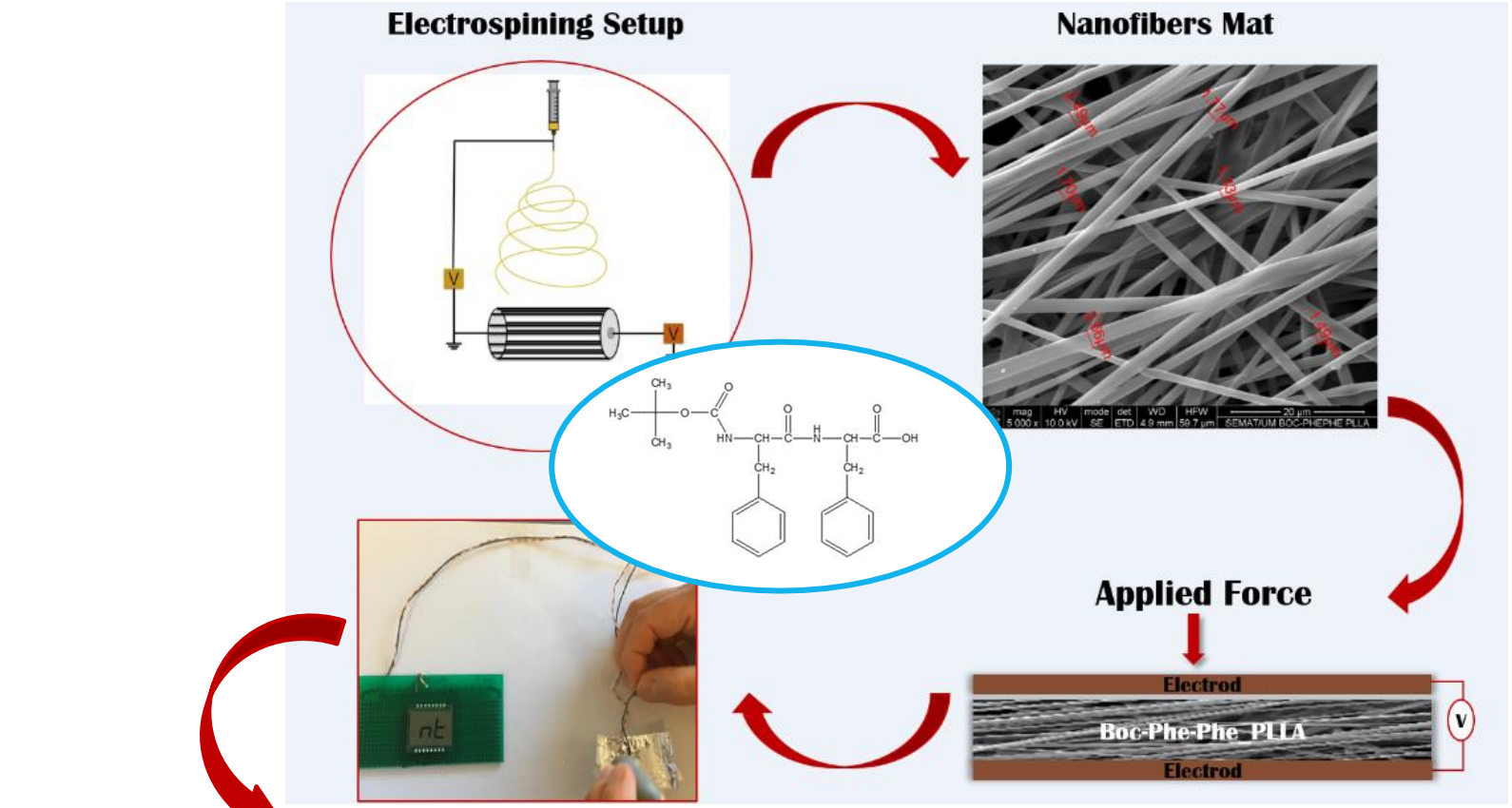


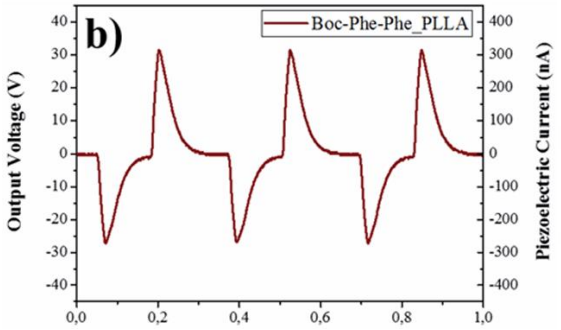


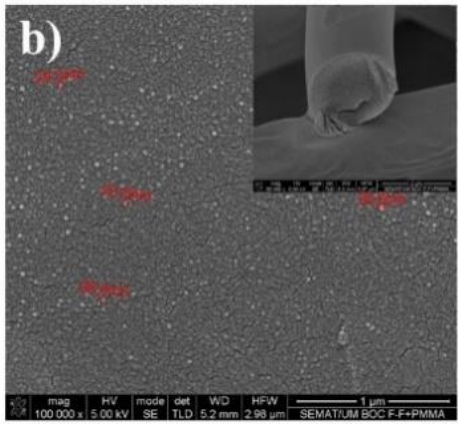
Baptista, R. M. F., et al., *Materials* **2022**, *15*, 8397.
Baptista, R. M. F., et al., *Micro* **2024**, *4*, 196.

NANOFIBERS FUNCTIONALIZED WITH CHIRAL DIPEPTIDES FOR ENERGY HARVESTING

- ✓ Self-assembling
- ✓ Quantum confinement
- ✓ Piezoelectric Nanogenerator



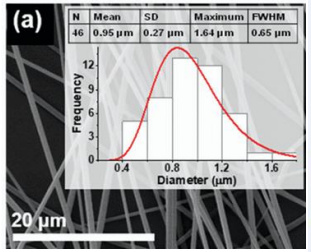


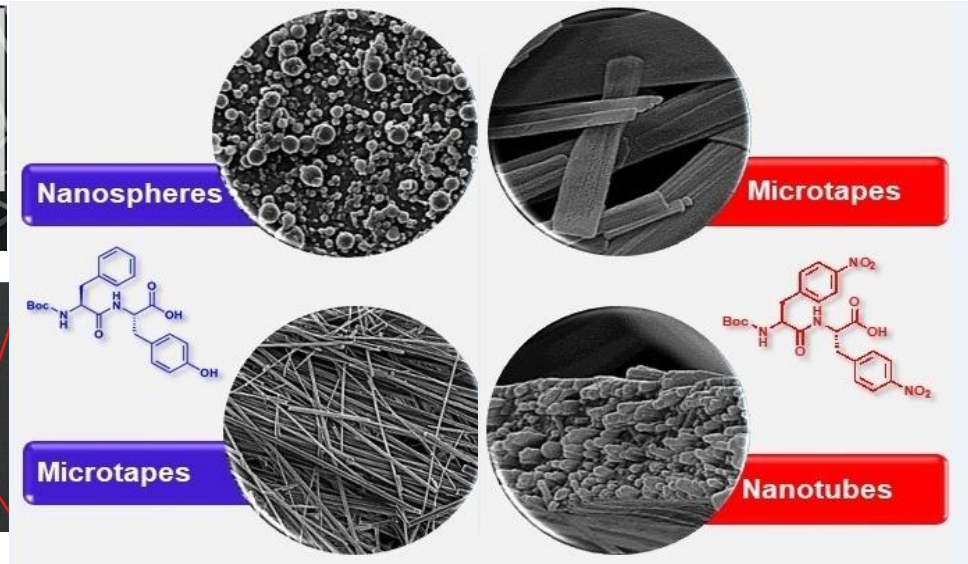


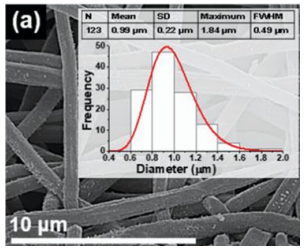
Baptista, R. M. F., et al., *Nanoscale Advances* **2019**, *1*, 4339.

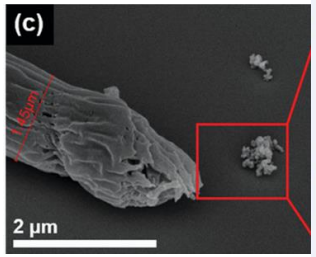
NANOFIBERS FUNCTIONALIZED WITH CHIRAL LINEAR DIPEPTIDES FOR ENERGY HARVESTING

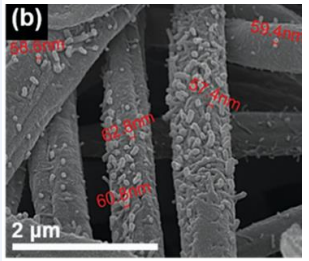
- ✓ Self-assembling
- ✓ Quantum confinement
- ✓ Piezoelectric response

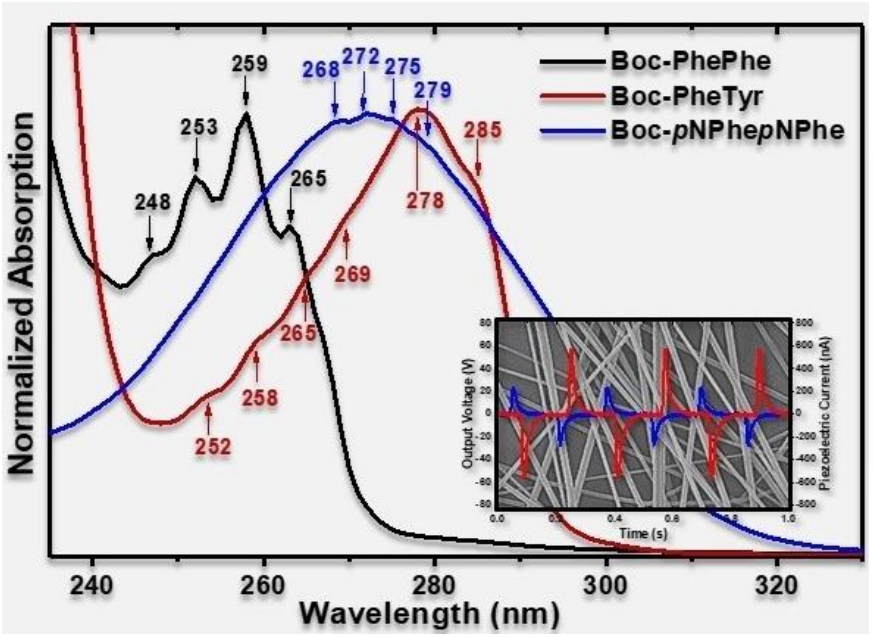


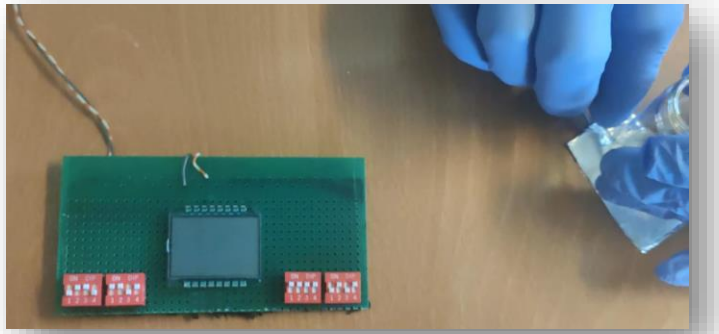








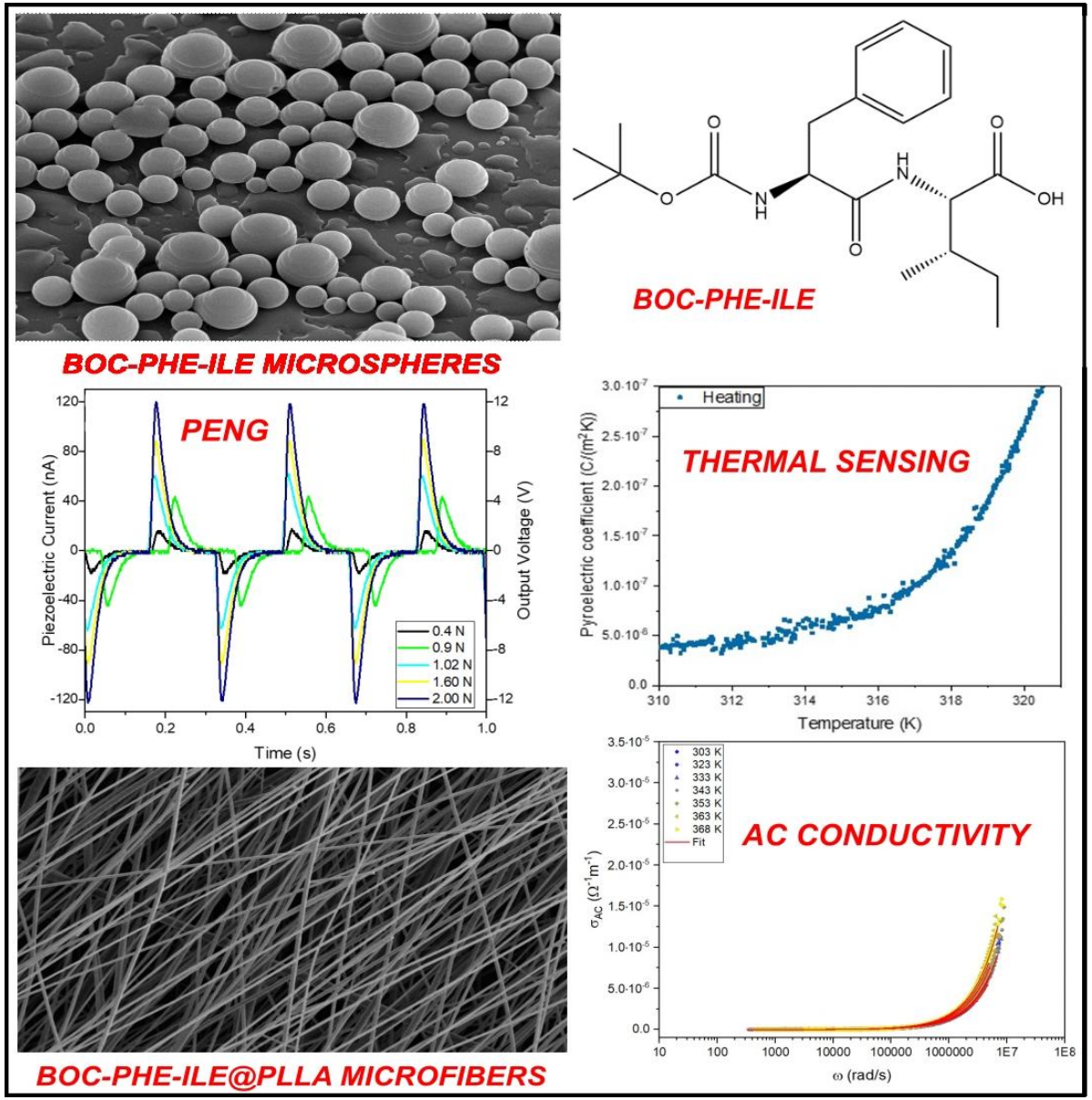




Baptista, R. M. F., et al., *Materials Advances* **2022**, *3*, 2934.

NANOFIBERS FUNCTIONALIZED WITH CHIRAL LINEAR DIPEPTIDES FOR ENERGY HARVESTING

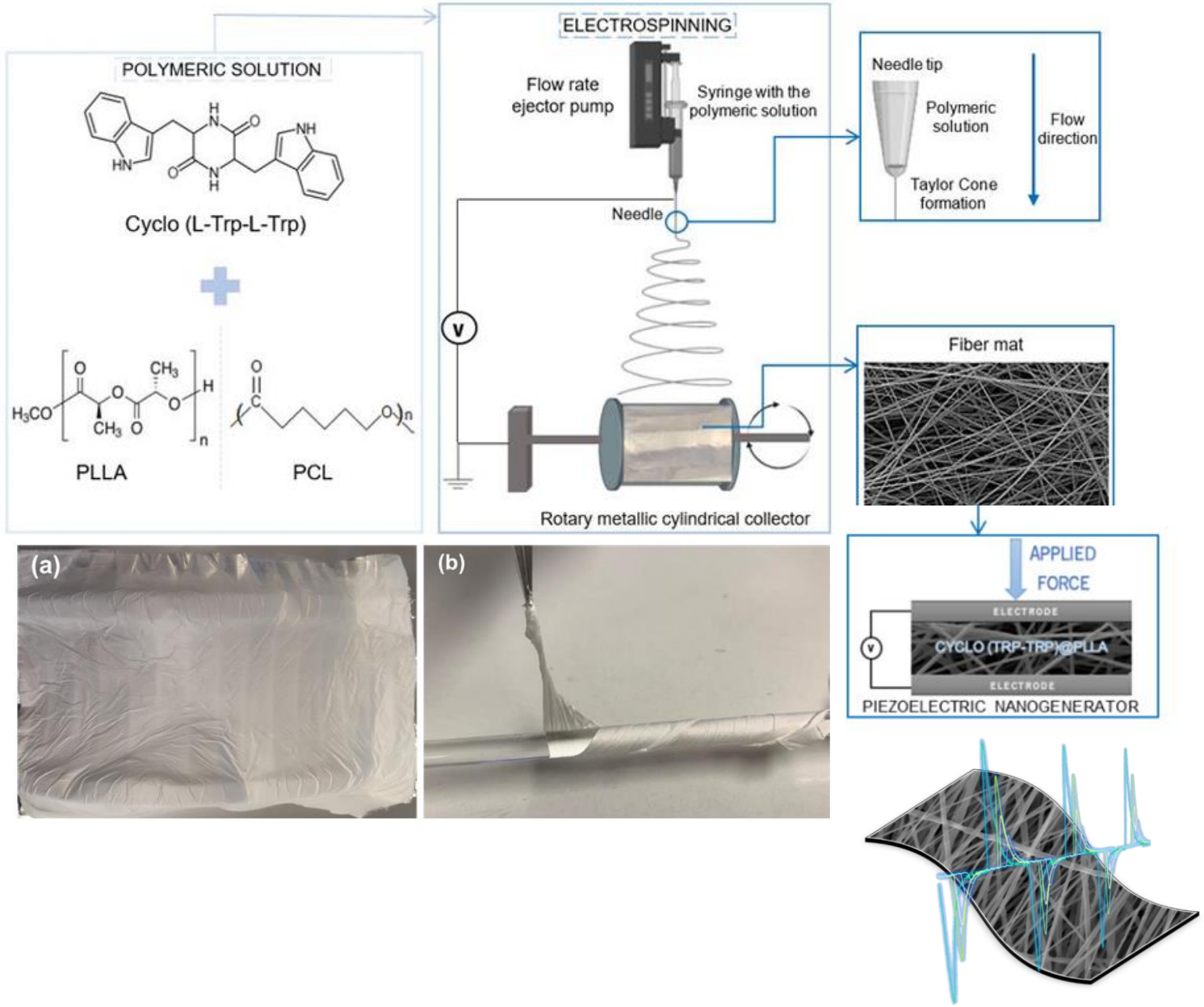
- ✓ Self-assembling
- ✓ NS quantum confined
- ✓ Pyroelectric
- ✓ Piezoelectric



Handa, A., et al., *Sustainability* **2023**, 15, 16040.

NANOFIBERS FUNCTIONALIZED WITH CHIRAL CYCLODIPEPTIDES FOR ENERGY HARVESTING

- ✓ Self-assembling
- ✓ Pyroelectricity
- ✓ Piezoelectric Nanogenerator
- ✓ Thermal stability
- ✓ Flexibility



Santos, D., et al., *Materials* **2023**, 16, 2477.

CONCLUSIONS

- **Synthesis of new chiral dipeptides:**
  - Linear and cyclic
  - Proteinogenic and non-proteinogenic
  - Aromatic and non-aromatic
- **Self-assembly studies in solution and fibers:**
  - Nanostructures with quantum confinement: nanospheres (NS), nanotubes (NT), nanoribbons (NR)
- **Synthesis of new crystals:**
  - Organic perovskites
  - Dipeptide-based crystals
- **Incorporation of active materials into fibers and measurement of anisotropic physical properties:**
  - Piezoelectricity
  - Pyroelectricity
  - Nonlinear optics
- **Development of a piezoelectric nanogenerator**
- **Production of other composite fibrous matrices:**
  - With carbon quantum dots (CQDs): for antibiotic photodegradation
  - With graphite: conductive fibers
  - With ferrite: magnetic fibers
  - With nitroanilines: for second-harmonic generation (SHG)
  - With biomolecules: antimicrobial fibers
  - With scintillating organic materials: fibers for radioactivity detection

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THANK YOU

Prof. Etelvina de Matos Gomes
Prof. Michael Belsley
Prof. Bernardo Almeida

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