



Bárbara L. Machado Calisto

Industrial Liaison Office

Overview of the Industrial Program at ALBA

industrialoffice@cells.es

5th of September 2024

The Industrial Liaison Office is a one-stop shop service which provides guidance and coordinates the whole process



Alejandro Sánchez
PhD in Physics

*15 years experience with
microelectronics companies*



Nuria Valls
PhD Structural Biology

9 years providing service to industry



Marta Avila
PhD in Chemistry

7 years providing service to industry



Bárbara Calisto
PhD Structural Biology

5 years providing service to industry



Virginia Boix
PhD in Physics

2 years providing service to industry

The mission of the **INDUSTRIAL PROGRAM** is to **promote and to make available to the industry all the potential of the synchrotron services** and developments to boost the innovation capabilities and the competitiveness of the industry and of the society.



One-stop Shop Service

MAIN ACTIVITIES

Outreach,
Manage Beamtime Access
Manage Laboratory Access
IP protections and technological transfer to the industry
Funding opportunities (EU and national) for companies

PROPRIETARY ACCESS

to ensure confidentiality and property of the results, fee for service

Industry as a User

ALIBAVA SYSTEMS
Very Low Absorption
Position & Intensity Monitors
The photons you lose at least counts

Alibava Systems offers Silicon Transmission Photodiodes with very low absorption < 15% (8 keV) and very high efficiency.

Single and 4 quadrants designs to perform intensity and position measurements.

Different configurations:
Vacuum (36 mm compact chamber, KF 40 terminations), **Standard** (opaque housing), both with individual coaxial Lemo connectors and **Naked**, for custom integration.

info@alibavasytems.com
T. +34 935 868 832
www.alibavasytems.com

This product is sold under license of Spanish National Research Council (CSIC) and the Consortium for the Exploitation of the Synchrotron Light Laboratory (CELSA). Developed in collaboration with ALBA Synchrotron.



Vacuum configuration



Standard configuration

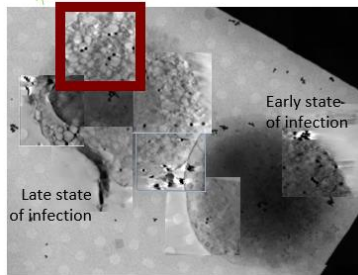


IP and Technology Transfer to Industry

Industry as a Supplier

Life Sciences

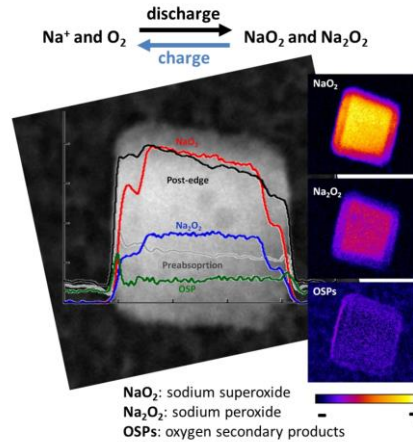
From the protein to the cell



Cell infected by covid-19

Chemistry and Material Science

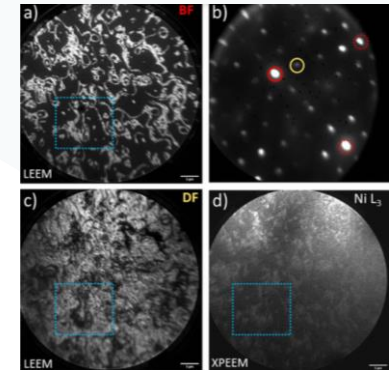
Energy material, catalysts, environment



Battery developments

Electronic and Magnetic Structure of Matter

Advanced materials



Nanomagnetism for data storage



CHEMISTRY



PHARMACEUTICAL



ADVANCED MATERIALS



ENERGY



HEALTH



NANOTECHNOLOGY



AUTOMOTIVE AND AEROSPATIAL



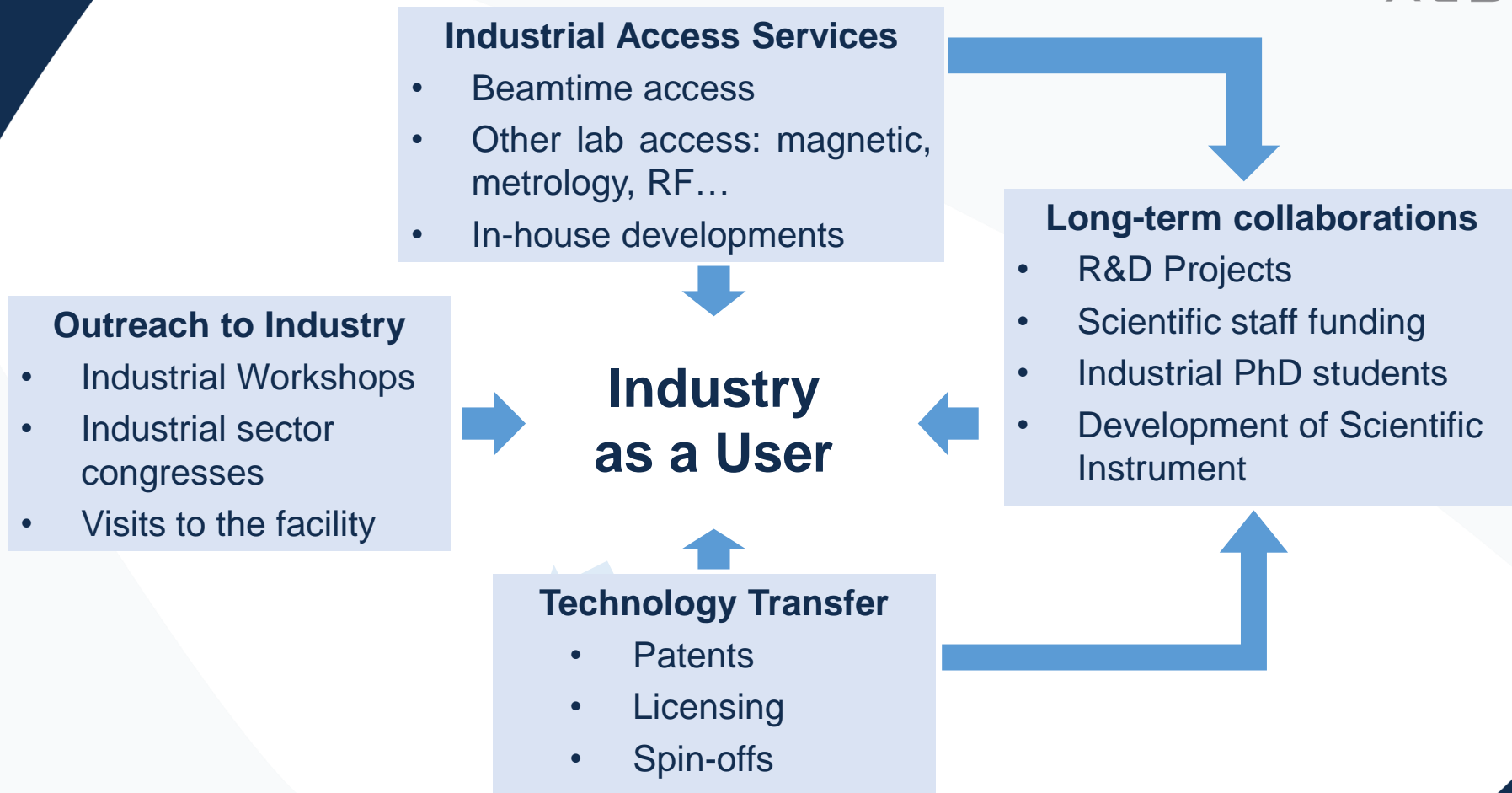
FOOD AND PACKAGING



ENVIRONMENT



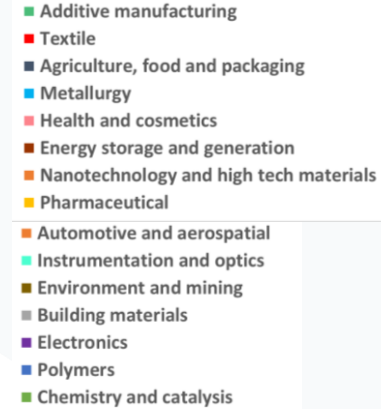
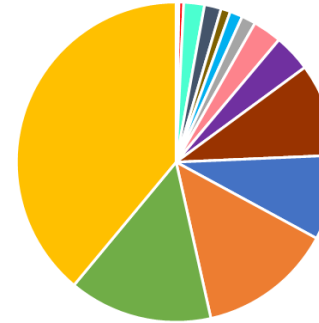
CULTURAL HERITAGE & FORENSIC SCIENCES



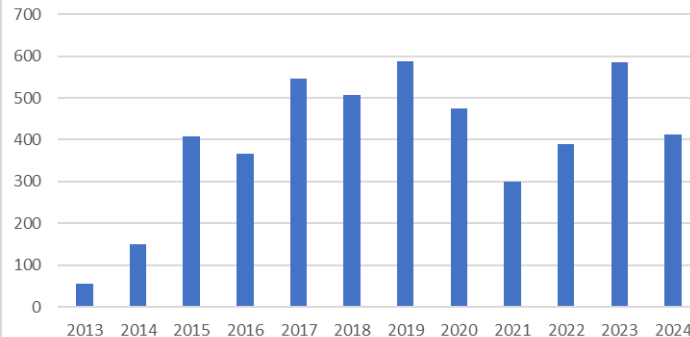
BEAMTIME USAGE BY THE INDUSTRY ALONG THE YEARS

- More than 90 companies
- SMEs and big companies
- Local, national and international
- Wide range of industry sectors

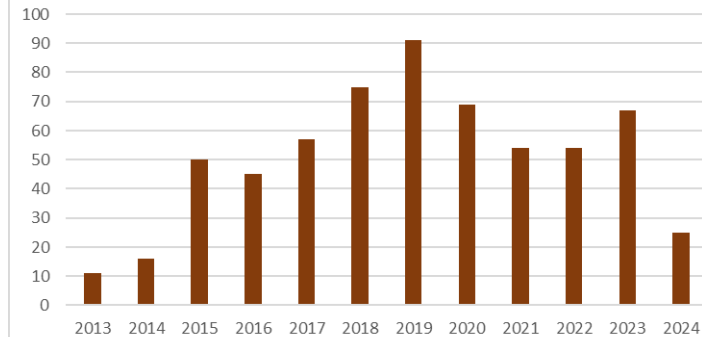
Beamtime / Industrial sector



Industrial hours / Year

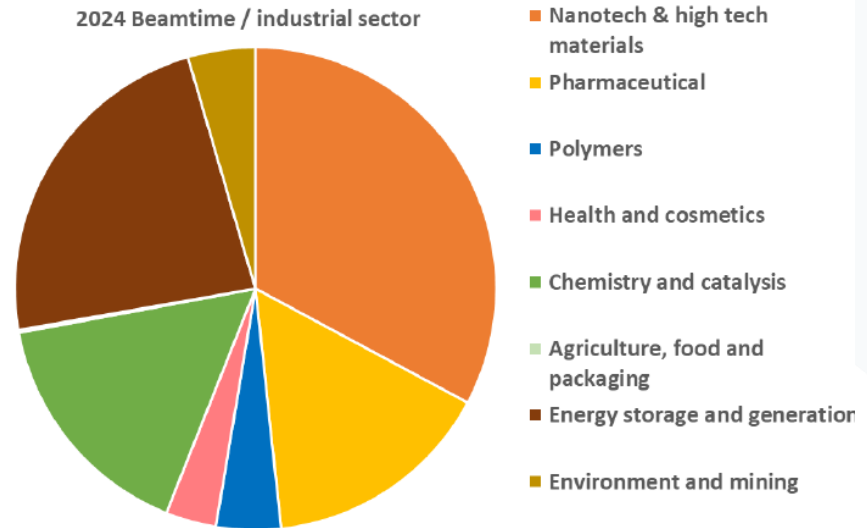


Number of experiments / Year



BEAMTIME USAGE IN 2024

- 530 h industrial beamtime
- 32 experiments
- 19 companies
- 10 new customers



Outreach to INDUSTRY



INDUSTRIAL APPLICATIONS



FOOD AND PACKAGING

WHAT INFORMATION CAN BE OBTAINED?

- Dynamics and stability of food emulsions.
- Phase transitions in fat and rheological activity in carbohydrate food.
- Determination of toxic chemicals including speciation in meat, fish, legumes and vegetables.
- Identification of chemical elements or species of a particular food for designation of origin purposes.
- Study of structural changes in plastics used for packaging and storage of products.
- Determination of copper and other metals in wine and liquors at their different oxidations steps.
- Chemical imaging of plants, seeds, grains, algae, etc.

WHAT ALBA DOES



HELPING TO DESIGN FUNCTIONAL FOOD
The ingestion of selenium in our diet is scarce to prevent cardiovascular diseases and so the metabolism of selenium in enriched with following the different absorbed selenium determine the best methods for producing.



HAM CURING PROCESSES AND TRACERS
Cured hams from different geographical areas were characterised in order to identify potential traceability. The evolution of Zn and Fe at different times during the curing process results enabled Spanish hams to be distinguished.



HOW TO OBTAIN THE VELVET EFFECT
The crystallisation of various polymorphic ALBA using chocolate and metal substrate. The results demonstrated that by reducing 1.5 °C, a velvet texture widely used in confectionery and this texture improves when using a chocolate.



WHAT CAN BE STUDIED?

- PRODUCTS FOR PERSONAL CARE AND HYGIENE
- COSMETICS
- DENTAL MATERIALS
- EMULSIONS, FOAMS AND GELS
- BIOLOGICAL TISSUES
- CELLS AND BIOLOGICAL PROCESSES
- BIOMATERIALS FOR BIOCOMPATIBLE IMPLANTS
- BIODEGRADABLES FOR DRUG ADMINISTRATION

WHAT ALBA DOES



ANALYZING ALZHEIMER'S MECHANISMS
Aggregates of different proteins are generated inside the suffering Alzheimer. Location and effect of such aggregates neuronal cells have been studied at ALBA. Results help the Alzheimer's mechanisms, to better identifying the disease and eventually to prevent its causes.



ESSENTIAL OILS
Essential oils are widely used as natural antimicrobial agents. Aggregates of different proteins are generated inside the suffering Alzheimer. Location and effect of such aggregates neuronal cells have been studied at ALBA. Results help the Alzheimer's mechanisms, to better identifying the disease and eventually to prevent its causes.



SKIN CARE COSMETICS
X-ray synchrotron diffraction makes it possible to observe structure of collagen present in the skin. Studies performed that infrared rays produce disorganisation in the structure effect can be prevented by using bilipidic systems. This is to address new formulations to protect against harmful effects.

HEALTH

WHAT INFORMATION CAN BE OBTAINED?

- Study of the structure, stability and phase transitions in environments such as water-oil-surface.
- Characterisation of the impact and penetration of chemical products on the skin, lips, nails, etc. times after application.
- Structural information of toothpaste, dental adhesives and adhesives for dental implants.
- Determination and study of the microstructure of tissue (muscles, ligaments, tendons) in 3D reconstruction of biological material of cellular mechanisms.
- Structural studies of materials used for bio-

TECHNICAL LABORATORIES

In addition to synchrotron light laboratories, ALBA has a set of **highly specialised technical laboratories** supporting synchrotron techniques and particle accelerator developments also able to offer their expertise in these fields.



Magnetic measurements laboratory

SERVICES

- Accurate magnetic measurements (100 ppm) of high magnetic fields of big structures (up to 2 m long).
- Measurement of coils for motors or other applications.
- Measurement of field maps of any type of magnetic structure.
- Measurement of multipole magnets (quadrupoles, sextupoles, etc.).
- Measurement of pure permanent magnetic blocks, isolated or assembled in holders, and sorting and aligning for constructing insertion devices.
- Modification and optimisation of magnetic designs using 3D simulation tools.
- Calculation of the main features of measured magnetic fields (integrals, high order harmonics and fiducialisation of magnetic fields with respect to mechanical references).



Outreach to INDUSTRY



Other outreach activities

At ALBA:

- Visit of “big brands”
- Companies and industrial associations

Outside ALBA:

- IndTech 2022 (Grenoble)
- Innovation Forum for Health (Sabadell)
- BSBF2022
- Cosmatorium 2023

Thematic Workshops for companies

- Opportunities for the science industry (*in collaboration with CDTI and Induciencia*)
- Industrial applications of ALBA Synchrotron in pharmaceutical industry
- Spanish Metallurgy Platform meeting



Workshop on Industrial research on battery manufacturing and recycling

Agenda of the day

- Welcome**
09:30 h Introduction to the Synchrotron
Alejandro Sánchez, Associate Director, Industrial Offices.
09:40 h Presentation and goals of the conference
Sergio Sáez, secpho
- Synchrotron applications to the battery industry**
10:00 h Application of synchrotron-based X-ray diffraction in battery industry | Alexander Mitchell, ALBA Synchrotron
Industrial Relevant Experiments with Synchrotron Radiation: Some Examples in the Field of Batteries | Pious Palacin, ICMAB
- Coffee Break – Networking**
10:40 h Characterization of battery materials
11:10 h -Synchrotron-based X-ray characterization techniques for the analysis of Li- and Na-ion battery electrode materials | Joseba Oñibe, CIC energGUNE
-Combining synchrotron techniques to unlock the battery performances | Laura Somersalt, ALBA Synchrotron
-Synchrotron-based characterization of industrially relevant cathode active materials with high energy density | Philipp Kurzba, BASF
- Other industrial applications of batteries**
12:10 h -Opto-mechanical solutions for laser processes in battery production | Juan Isaza, EXOM
-Laser applications in battery manufacturing | Mikel Bengoa, Coherent
-In-line Non-Destructive Inspection of Li-ion Batteries | Jordi Sobron, Hamamatsu
-Battery monitoring using thermography: Hot spot and gas detection | Javier Bezares, bti
-Battery remanufacturing, a second life before recycling | Jesús Tocaedo, TerrePower Europe
- Opportunities with the ReMade@ARI funding**
12:50 h **Networking Lunch**
13:00 h Visit to the synchrotron laboratories
14:15 h B2B Meetings – Networking coffee
15:30 h
17:00 h End of the event



secpho

26 April 2024

Presentations



Guided tour



Networking



B2B meetings



7 industry talks // 65 attendees // 23 companies // >100 B2B meetings

https://www.secpho.org/en/agenda/alba_synchrotron_batteries/

ALBA HACKATHON

SCIENTIFIC COMPETITION

COMPANIES SET A
CHALLENGE TO A GROUP OF
PARTICIPANTS

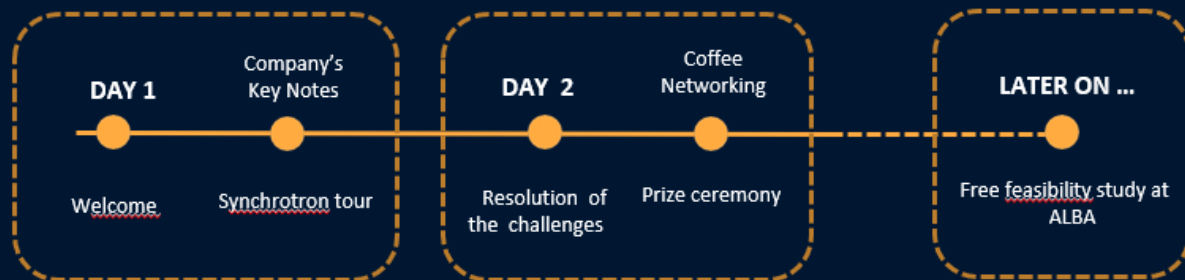


6th and 7th March, 2025

TO BE SOLVED BY USING
SYNCHROTRON TECHNIQUES,
WITH **CREATIVITY, INNOVATION**
AND IN A **FEASIBLE** WAY



Great opportunity
to attract
companies and to
capture talent!
All participants' CVs
will be shared



Diputació
Barcelona



Ajuntament de
Cerdanyola del Vallès



Parc de Recerca UA[†]



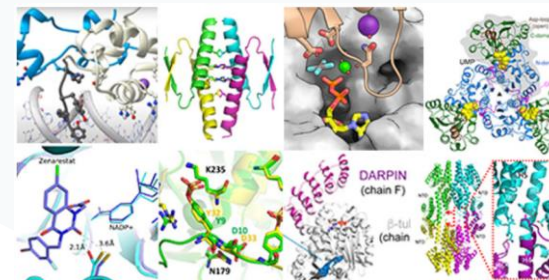
Relations with Pharma Industry



EXPLOITING
CAPABILITIES



A dedicated
Industrial Liaison
Scientist



NETWORKING



SPANISH
Drug Discovery Network



OUTREACH

JORNADA
Aplicaciones del Sincrotrón ALBA para la
industria farmacéutica
17 Junio 2022
09:30 - 15:00h



Relations with Energy Storage



DEVELOPING
RESOURCES



A dedicated
Industrial
Liaison Scientist
(to be hired)



NETWORKING



secpho

OUTREACH

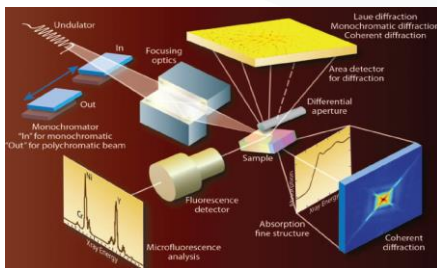
LEAPS-INNOV Battery Forum



Relations with Steel Industry



DEVELOPING
RESOURCES



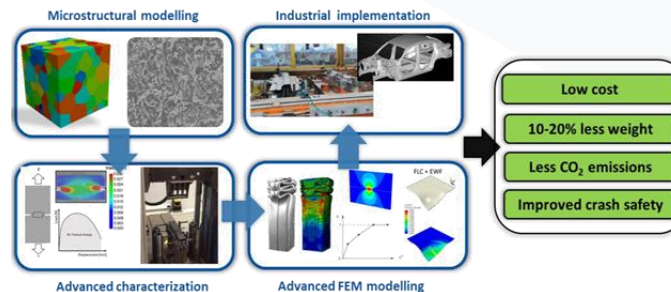
A dedicated
Industrial
Liaison Scientist
(inCAEM funds)

Scanning Transmission
Electron Microscope,
METCAM at JEMCA
+ InCAEM (Planes
Complementarios)



COLLABORATIONS

Collaboration Agreement



OUTREACH

Programa
**Tecnologías disruptivas
y su aplicación al sector siderúrgico**

Miércoles 28 de septiembre
10 – 17:30h

Sincrotrón ALBA
Cerdanyola del Vallès (Barcelona)

Incluye visita a las instalaciones del Sincrotrón

ALBA SYNCHROTRON FOR INDUSTRY
industrialoffice@alba.es

ALBA SYNCHROTRON FOR AERONAUTICS
industrialoffice@alba.es

ALBA SYNCHROTRON FRIENDLY CUSTOMER SERVICE
industrialoffice@alba.es

Synchrotron techniques provide outstanding results not achievable with other techniques

- Synchrotron light is very powerful to characterize in depth agricultural products.
- ALBA provides results focused on the company's specific needs.
- The industrial office of ALBA provides easy access to industry through one-stop shop.

A LARGE FACILITY TO STUDY MATERIALS AT ATOMIC LEVEL

- CHEMISTRY
- ADVANCED MATERIALS
- NANOTECHNOLOGY
- PHARMACEUTICAL
- HEALTHY
- FOOD AND AGRICULTURE
- ENVIRONMENT
- AUTOMOTIVE AND AEROSPACE
- ENERGY

ALBA

Contact us for a meeting at
INDUSTRIALOFFICE@ALBA.ES

Relations with ICT companies



Twining on **Functional Layered Materials**
for **Advanced Applications**

**Functional Layered
Materials Technologies &
Stakeholders Workshop**



MAX-PLANCK-INSTITUT
FÜR MIKROSTRUKTURPHYSIK



Funded by
the European Union

Examples of Industrial Research

Long-term contract with HENKEL



BASF, UPC and ALBA propose a methodology for producing better additives for concrete technology



Helix BioStructures performs first post-lockdown COVID-19 measurements at ALBA



SAMTACK benefits from synchrotron light for improving food packaging

The company is analysing nanoparticles contained in a new food packaging system that will prevent food oxidation and extend its lifetime.



ENANTIA uses ALBA's X-rays to detect crystalline impurities in drug products



TOYOTA and CSIC proved viability of calcium-based batteries



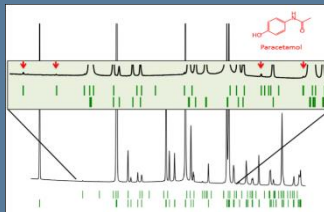
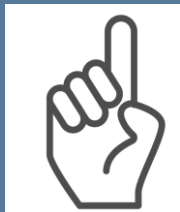
The Spanish Research Council (CSIC) in collaboration with TOYOTA Motor Europe (TME) demonstrates the viability of Calcium rechargeable batteries using ALBA techniques.

ESTEVE, UAB and ALBA Synchrotron join efforts to investigate the mechanism of action of new inhibitors against pain

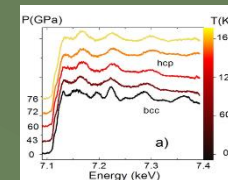
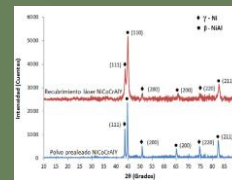


Access modes for Industry

Single service



Long collaboration



Several techniques are required

Joint service with partners



Challenge

Techniques
& skills

Advanced
techniques

Funded EU projects



Access via European projects



LEAPS-INNOV

- Specific programme for SMEs
- Free access to ALBA
- **CALL OPEN:** <https://wayforlight.eu/en/industries/>



ReMade@ARI

REcyclable **MA**terials **DE**velopment at **AN**alytical **RE**search **IN**frastructures

- Projects addressing circular economy
- Specific programme for industries
- Free access to ALBA



SYLINDA project (with SOLARIS, synchrotron in Poland)



- Sharing experiences to **improve the services**



LEAPS-INNOV has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101004728
SYLINDA has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 952148

Participation in European projects



H2FORM3G

Sup3rForm

COOPHS



nephews

Neutrons and Photons
Elevating Worldwide Science

nffa.eu | **PILOT**

STRATEGY of the Industrial Program

- **Customer loyalty** & satisfaction of the provider
- **Promotion of the industrial program:** reach-out to more companies, mainly local, to enable these to build-up their technological competences
- **Support companies** with all the expertise and resources ALBA can provide towards innovation
- **Diversify and extend the present portfolio of services:**
 - the novel synchrotron techniques of the new beamlines
 - the improved synchrotron techniques of the upgrades of the existing beamlines
 - the hub of the four pillars around ALBA II
 - Joint Electron Microscopy Center ALBA: Cryo-TEM and METCAM

INDUSTRIAL APPLICATIONS



industrialoffice@cells.es

THANK YOU!

