For a better future

CRM Group

Independent Research organization founded in 1948
Developing industrial solutions involving metals in many sectors

290+
researchers

45+ members
> 350 clients

Liège & Gent
Lab surface > 20.000 m²

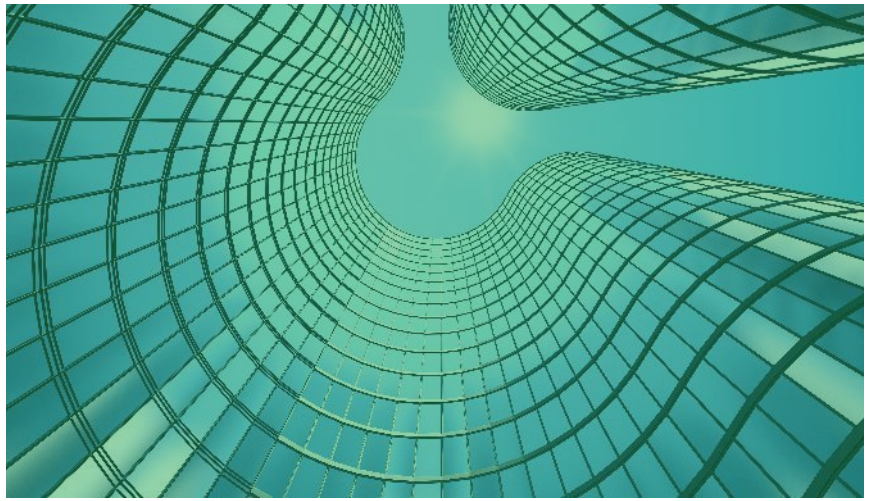
49M €
Global budget

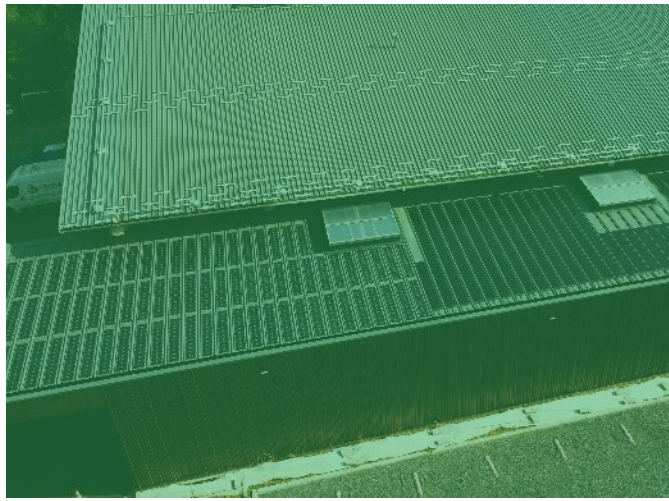
John Cockerill · SARCLAD · SAFRAN · ArcelorMittal · Bekaert · NLMK La Louvière · Recydel · MAGOTTEAUX · PRAYON · ESW · EMC · TATA STEEL · EQUANS · AGC · PRIMETALS · HERSTAL group · Lhoist · aperam · AMEPA · orbix · Westinghouse · Air Liquide · sonaca · suez · resa · PHARMA TECHNOLOGY · BioCarbon Industries · DREVER International · Laborelec · HYDROMETAL · TMT · FIVEN · NLMK Clabecq · Aurubis · MARICHAL KETIN · INDUCTOTHERM · Duferco · Heraeus · Simaform · DE LEUZE s.a. · PAUL WURTH · IMnI · TECforLime · TI Automotive

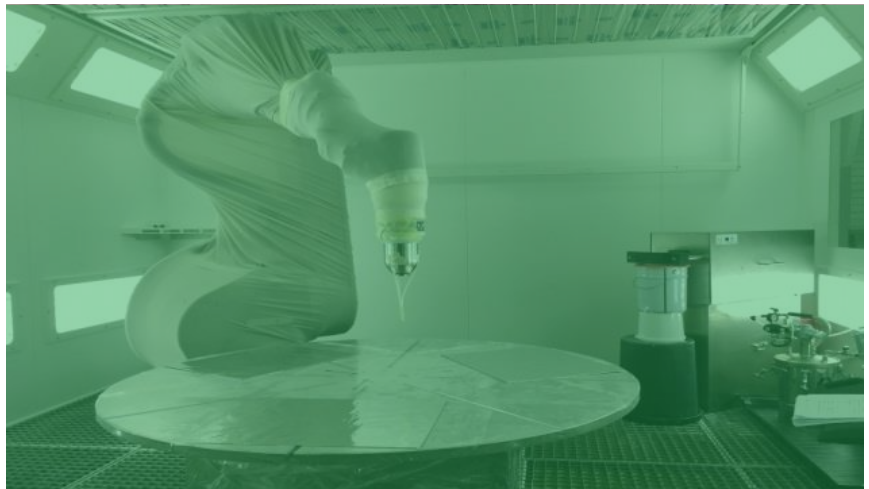
Our development axes

Vision & innovation with industrial solutions

- **PROCESS – PRODUCT – APPLICATION DEVELOPMENT**
- **ENERGY SHIFT**
- **ADVANCED MANUFACTURING**
- **INDUSTRY 4.0 & DIGITALISATION**
- **CIRCULAR ECONOMY**
- **CONSTRUCTION**







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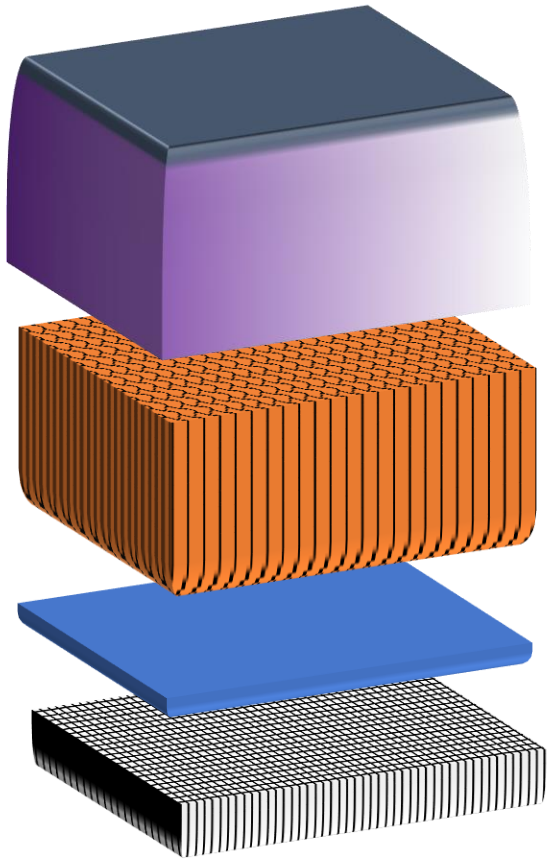
Battery Cell Design Production Recycling



Current collector (ex. Al)
- Protective or functionalized coating

Positive electrode (ex. LMFP, C, binder)
- Ink deposition on current collector or on solid electrolyte at pilot scale

Electrolyte
- Solid or liquid
- Hybrid (organic/inorganic)

Interlayer
- **Anolyte development pilot scale**

Negative electrode
- Ink deposition on current collector or solid electrolyte at pilot scale
- Li metal (lab scale)

Lab2Pilot scale
Recycling technologies
Batteries: Ni, Co, Mn, C, Li, P

Pyrometallurgical processes
- Separation & sorting
- Materials preparation
- (Vacuum) thermal treatment
- Smelting (induction, plasma)

Experience on hand for all TRL levels

- Modular and flexible mindset
- Complex boundary conditions (vacuum, clean room ISO7, glove box)
- Broad process window validation including coating formulation
- Multi-technology approach (evaporation, sputtering, wet, dry)
- Wide range of metal and non-metal substrates
- Integration of additional process steps (cleaning, multi-layer)

Steel, Al, Cu, plastic

Thickness : 4 µm – 0.4 mm

Lenght : 100 m – 2000m

Width : 50 – 300 mm

Speed rate : 5mm/min - 20 m/min

QR code laser print

TRL 1-3 Glove Box

TRL 3-6 VACUUM deposition

TRL 4-6 WET deposition

NMP-Free LFP-based ink

In practice today and tomorrow

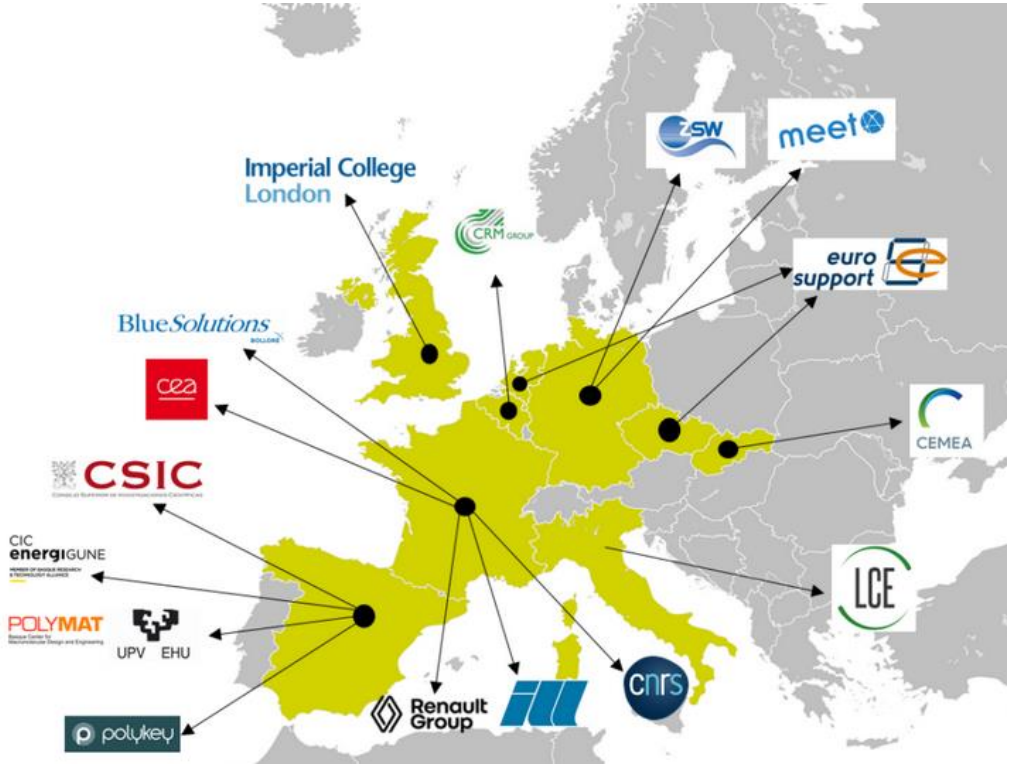
SEAT BELT — Solid-statE lithium metal bAttery wiTh in situ hyBrid ELecTrolyte

Funded by the European Union

14 beneficiary partners
7 EU countries
Budget = 7 851 448.50€

Advanced high-performance GEN. 4a, 4b (solid-state) Li-ion batteries supporting electro mobility and other applications (01/06/22 – 31/05/26)

Anode	Separator	Cathode
Li metal	Hybrid organic/inorganic electrolyte	LMFP ($LiMn_xFe_{1-x}PO_4$)



- ***Objective*** : *Several dozens of Ah Battery cell*
  Project TRL: 1 - 5
- ***Key concept*** :
  1. ***Circularity :*** *eco-responsible materials, recycling compatibility*
  2. ***Safety :*** *solvent-free process (extrusion), solid electrolyte*
  3. ***Efficiency :*** *interfaces optimization by operando methodologies vs. current Li metal polymer battery (SoA = commercial Li-LFP)*

NEED

A virtuous concept meeting all technical, economic and environmental challenges

CHALLENGE

Technical solution

Collaborative ecosystem

Economically viable

In line with Scope 1-2-3

OFFER

We accompany you from blank page to industrial level

We offer experience in complex environment, at relevant speed and full-size development

We make it work

THANK YOU

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