HealingBat

ADVANCED SENSING, MONITORING AND SELF-HEALING MECHANISMS TO SELF-REPAIR BATTERIES

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Coordinator

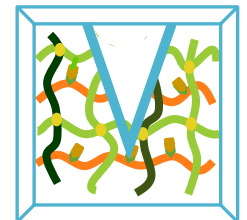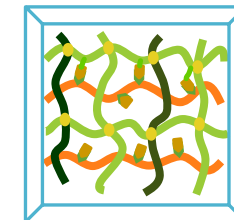BATTERY 2030+
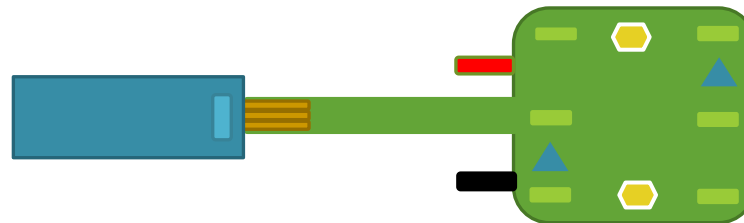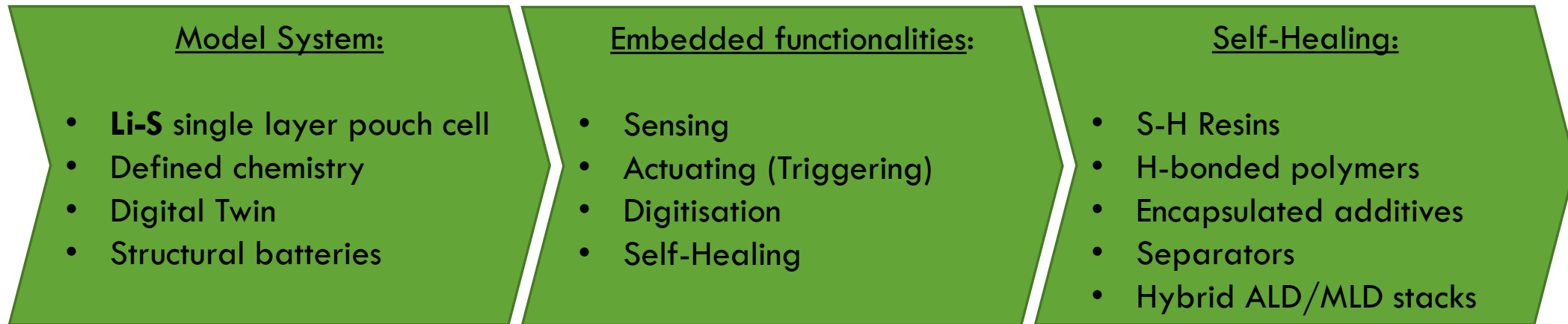
HealingBat Consortium

Partners

- TU Dortmund (coordinator)
- Center for Process Innovation
- Coventry University
- Helmholtz-Zentrum Berlin für Materialien und Energie GmbH
- TU Delft
- Paul Scherrer Institute
- IDNEO
- Fundació Institut de Recerca de l'Energia de Catalunya
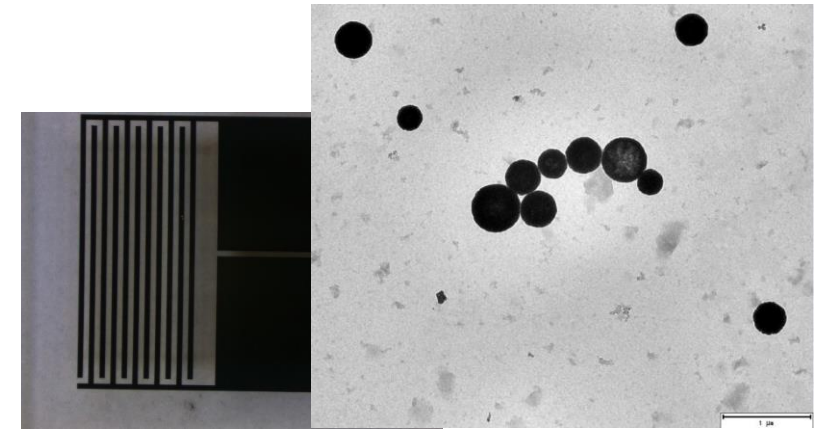- FI Group
- SUPRAPOLIX

HealingBat Goals

- Build model system to demonstrate self-healing

- Embedded Sensors & actuators as part of BMS & to build a digital twin

- LCA

Model System:	Embedded functionalities:	Self-Healing:
- **Li-S** single layer pouch cell - Defined chemistry - Digital Twin - Structural batteries	- Sensing - Actuating (Triggering) - Digitisation - Self-Healing	- S-H Resins - H-bonded polymers - Encapsulated additives - Separators - Hybrid ALD/MLD stacks

HealingBat Results

- FEM simulation of model system Pouch cell

- Technology flow for v1.0 of embedded sensing and thermal actuator
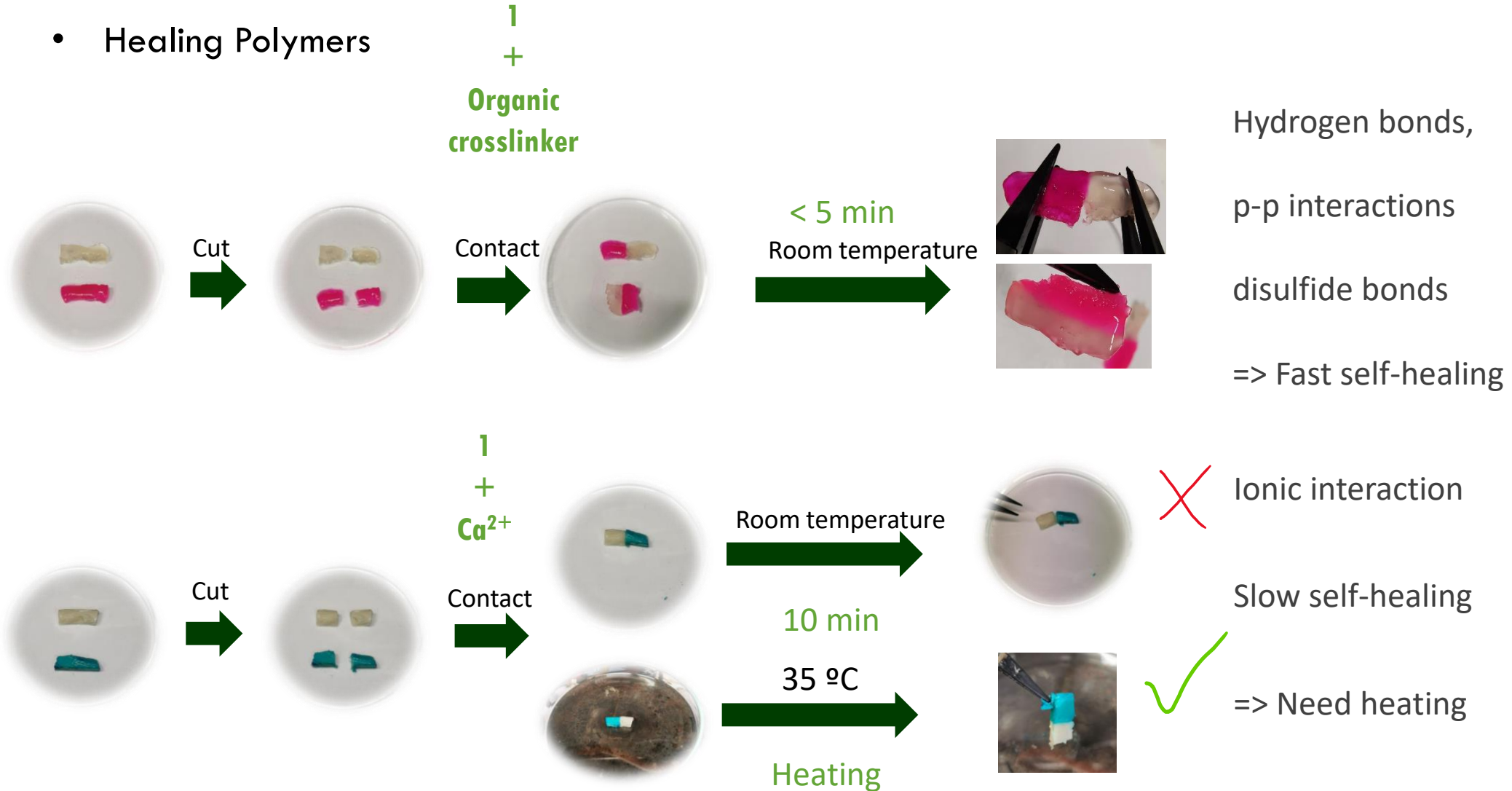
- Micromachined sensor structures

- Printable functional inks for gas sensing
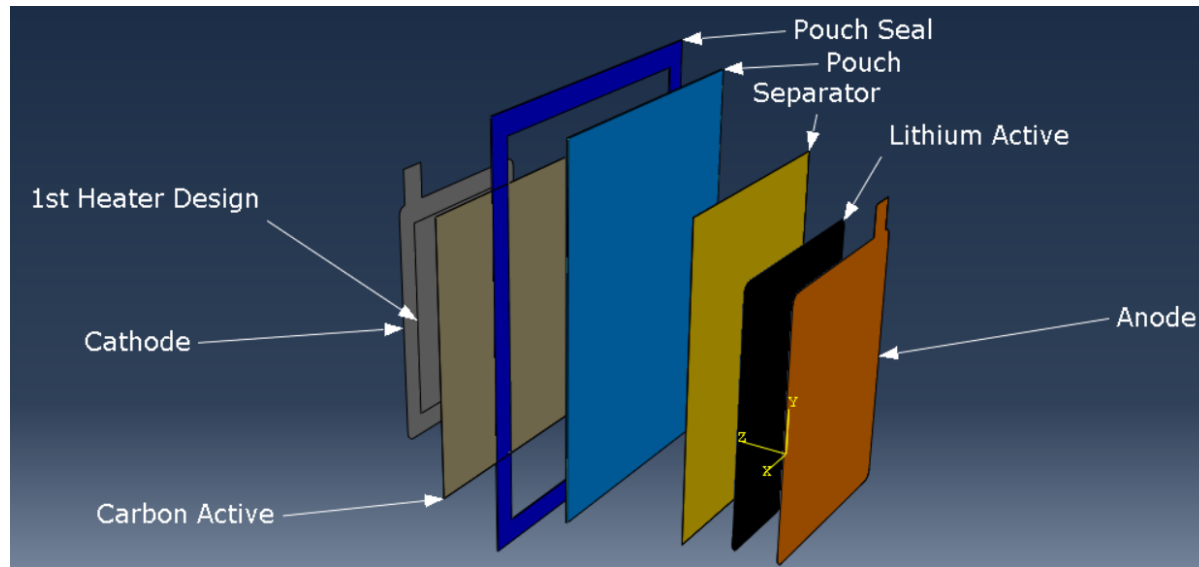
HealingBat Results

- Healing Polymers

1
+
Organic crosslinker

Cut → Contact → **< 5 min** Room temperature →

Hydrogen bonds,

p-p interactions

disulfide bonds

=> Fast self-healing

1
+
Ca²⁺

Cut → Contact → Room temperature ✗

10 min

35 ºC

Heating ✓

Ionic interaction

Slow self-healing

=> Need heating

5

HealingBat @ Roadmap

1) Which objectives of my project could be added to the roadmap goals?

Scalable, low-cost & embedded sensors

Integration of tailor-made sensors, actuators & BMS

Demonstrate benefits of added system complexity

2) What are the expectations of my project from the future roadmap?

Possibility to advance on promising results, i.e. open topic option

Integration/Closer collaboration of basic research & technology,
e.g. interface vs. self-healing projects