



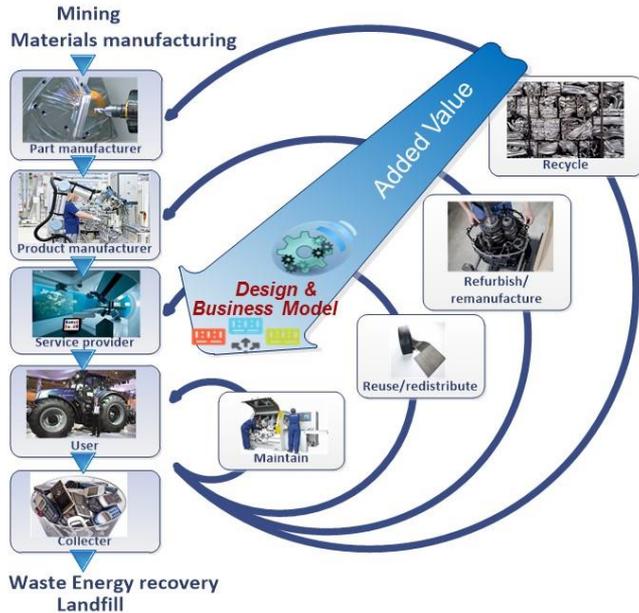
# Circular economy & materials innovation

Looking for future solutions

Embracing technology  
Embracing ambition

**.AGORIA**

# Materials at the heart of circular economy



- **Recycling is already strongly developed in Flanders:**
  - Still some challenges & opportunities: e.g. slags, plastics, composites, advanced materials, ...
- **High potential of the inner circle:**
  - Design for recycling, reparability, higher functionality, longer lifetime, resource efficiency, ...
  - Innovative materials design as enabler
- **New business models & impact on materials life cycle**

Materials play a central role in enhancing the circular economy of the future

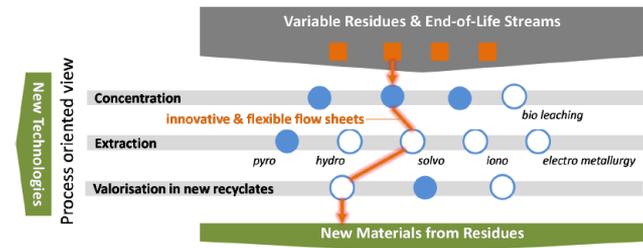
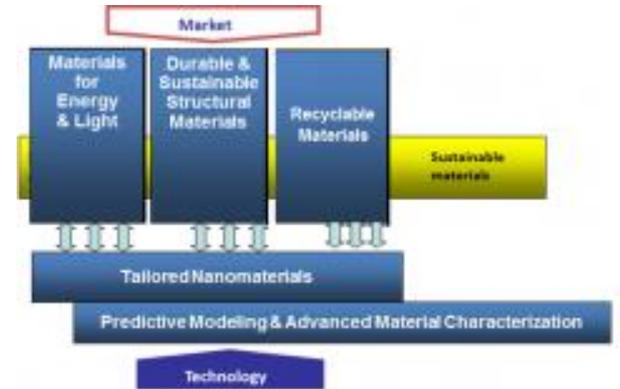
# SIM & Circular economy

## ■ SIM program recyclables materials:

- Research to improve recyclability of (advanced and complex) materials and products (e.g. photovoltaics, composites, nano materials,...)
- Substitutions for critical raw materials
- Extraction and separation techniques for complex and hybrid materials

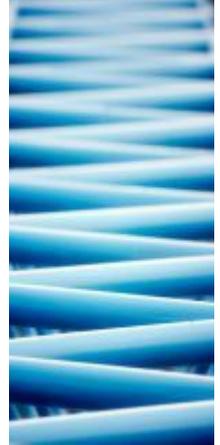
## ■ SIM Mares:

- Novel cement & building materials from incineration ashes
- Groundbreaking extraction technology for critical metals & metalloids from industrial wastewaters
- Sustainable metal extraction from tailings
- Sustainable transformation of new and landfilled solid industrial residues into metals & inorganic polymers



# SIM & Circular economy

- **Durable, sustainable & structural materials:**
  - Hybrid structural materials
  - High performance structural materials with multi-functionality
  - Sustainable processes
- **Different programs:**
  - Next generation nano-engineered polymer hybrids: increased durability, improved recyclability and low weight
  - Self Healing engineering materials: cementitious, polymeric and coatings
  - Structural engineering materials through additive manufacturing
  - Material durability for off-shore applications



Added value to the circular economy through longer lifetime, more functionality, higher resource efficiency, ...

# Potential future actions @SIM: recycling

- **Recycling potential of metals from water residues:**
  - Volumes of water residues with interesting metals?
  - Business case & solutions for pilot plant?
- **High quality use of slags in building products:**
  - Increase the opportunities for slag use in construction products for solutions of produced & landfilled slags
  - Linkage potentially with Green Deal Circular purchases
- **Valorization of landfill waste:**
  - Clean up of existing landfills within Flanders, Europe & third world
- **Linkage with results of VIL study Flanders Recycling Hub:**
  - Identification of waste streams for recycling within Flanders
- ....

Valorization of results of MARES into higher TRL levels

# Potential future actions @SIM: sustainability

- **More difficult to identify but think about resource efficiency, increased functionality, longer lifetime, ...**
  - Printable electronics – doing more with less
  - Additive manufacturing & novel materials – better use of materials
  - Self healing surfaces – longer life time of products
  - Structural materials – doing more with less
  - Advanced materials, ...
- **Challenge is to ensure recyclability of innovative complex materials solutions**
- **Potential way forward:**
  - Identification of interest @companies: creation of specific interest groups around certain topics
  - Potential focus on higher TRL's, pilot plants, feasibility and market studies, ...

# Circular Economy Day Belgium – 21/11/2017



- **Professor Mark Miodownik, University College London: on material innovation as an enabler for circular economy**
  - <https://www.youtube.com/watch?v=65stkLB3QAK>
- **Professor David Peck, TU Delft: on circular design**
  - <https://www.youtube.com/watch?v=74jLSzBT440>
- **Kenneth Cukier, The Economist: on big data as an enabler for circular economy**
  - [https://www.ted.com/talks/kenneth\\_cukier\\_big\\_data\\_is\\_better\\_data](https://www.ted.com/talks/kenneth_cukier_big_data_is_better_data)
- **Including morning session on KIC Raw Materials**

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# Thank you

For your attention

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