



***BACTERIAL REVALORIZATION
OF PRECIOUS METALS
FROM WASTE WATER***

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Horizon2020 Information Days on Public-Private Partnerships

**Brokerage event
21 October 2014**

 **MateriaNova**
MATERIALS R&D CENTRE

SPRE
Sustainable Process Industry through
Resource and Energy Efficiency

MATERIA NOVA R&D



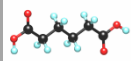
Ghislenghien



Mons

- Non-profit organisation
- 85 employees
- Turnover 8 Mio€
 - Applied research programs
 - Tests and analysis
 - Scientific advices and consultancies

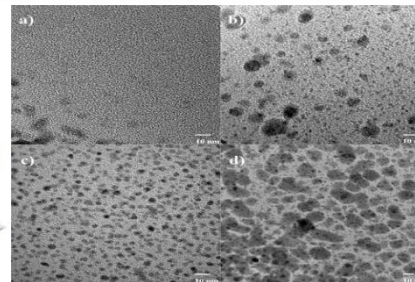
Biotech Unit



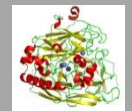
monomers



bioproducts



bacteria
fungi



enzymes

REVALORIZATION OF METALS

PROJECT IDEA

Problems:

- Precious metal losses over time (particularly in effluents of low concentrations)
- Increasing importance and economic value of metals (need to recover and recycle)
- Market demand for specific nanoparticles (NPs)

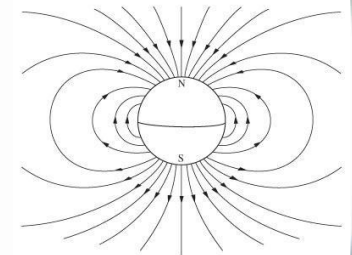
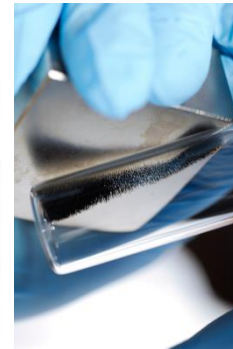
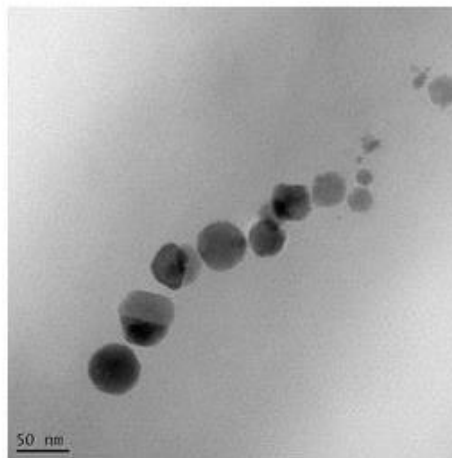
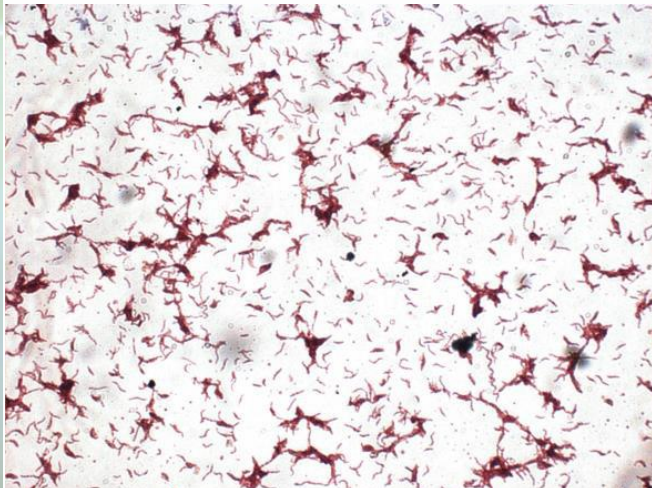
Actual 'innovative' technology (Solution):

- Selective **bacterial nanoparticles production** (Iron, Gold, Silver, ...)
- Intracellular formation or extracellular association/precipitation...
- High value NPs – specific sizes, properties, functionalities, ...

H2020 Sustainable Process Industries

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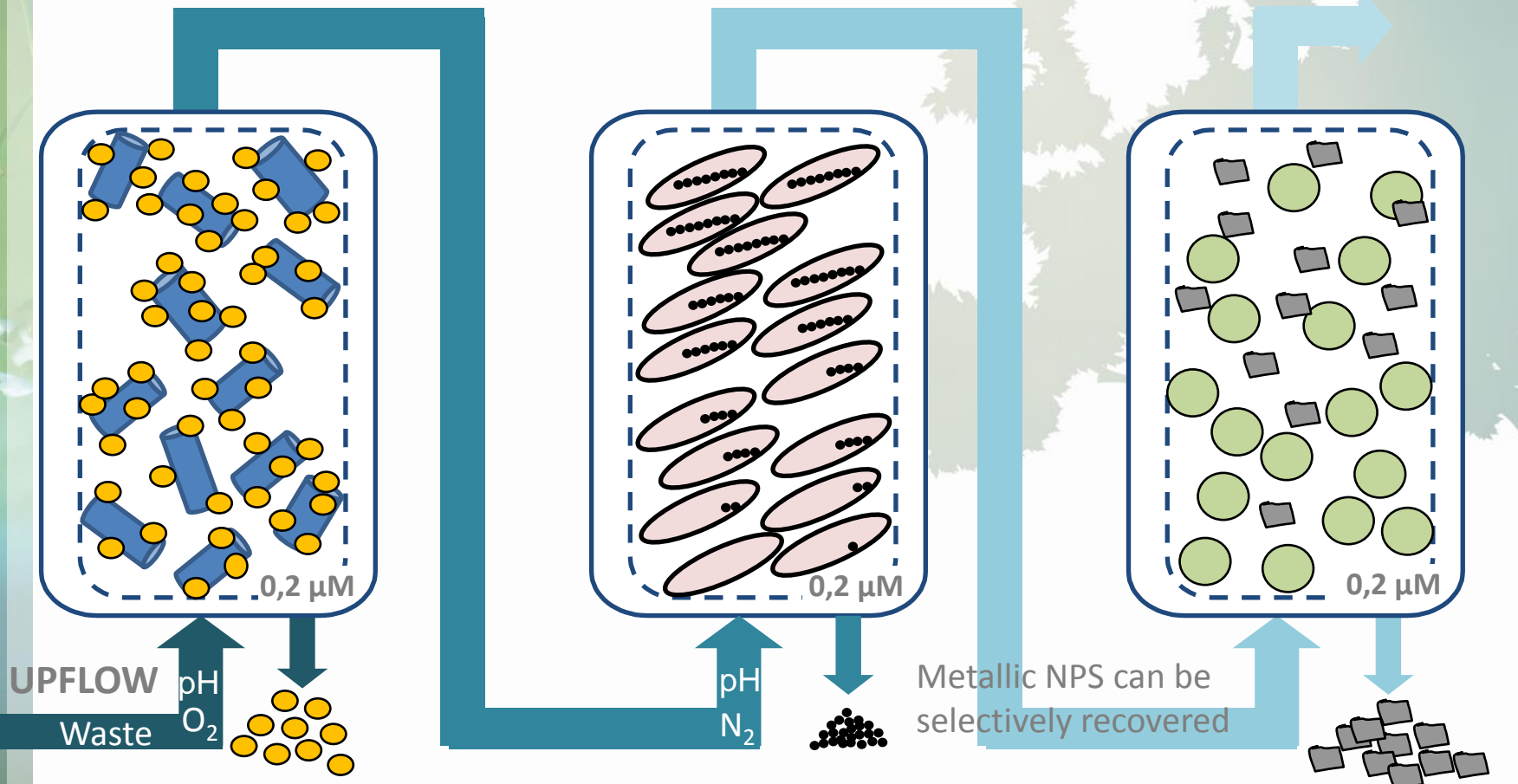
Topic: Recovery technologies for metals and other minerals



REVALORIZATION OF METALS

PROJECT IDEA

Efficient and **simple** industrial effluent *re-valorisation* technology
Compatible with currently existing plants + working with **low concentration streams**





REVALORIZATION OF METALS PROJECT IDEA

Integration in SPIRE roadmap:

Waste2Resource:

- Liquid **waste streams** to selectively produce high-value metallic NPs

Process/Feed:

- **Simplicity** but **high specificity** (compared to physical or chemical methods)
- **Low energy process** : avoidance of high energy or toxic chemical addition
- Integrated process: Possible use of existing water treatment canisters (refillable cartridges) for a complete **integration in current industrial scenario** as an in-Line process at several scales and industry sectors

Applications:

- Specific and high value product output enabling a multi-sectorial deployment
- Synergies between cross-sectorial industries in surface treatment, biosensors, energy and microelectronics...

H2020 Sustainable Process Industries

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Deadline Date: 04-02-2015



EXISTING PROJECT CONSORTIUM



Materia Nova | R&D centre
Global process development + LCA/LCC + Coordination



University of Mons | Proteomic And Microbiology
Metabolic pathway analysis + optimisation



Ionics | SME active in surface treatment
Effluent + use of revalorized nanoparticles



Bio Base Europe | Flexible and multipurpose pilot plant
Scaling-up



CIDETEC | R&D centre
New metal nanoparticles based biosensors + stabilisation of metal NPs using poly(ionic liquids)

LOOKING FOR PARTNERS

INDUSTRIAL PARTNERS

- Diverse valorizable effluents
- Carry out demonstration activities in industrial environment

RESEARCH PARTNERS

(Universities, R&D centre, SMEs with R&D capacities)

- Specialist in metallurgy
- Expertise in metallic NPs analysis (sizing and size distribution)
- Industrial water engineering + microelectronics
- Environmental impact (toxicology)
- ...

EXPECTED IMPACT

1. Co-development of an **innovative ecological technology for metals treatment from liquid waste streams** between the biotechnology, nanotechnology, metallurgy and water treatment sectors (converging technologies, Life Cycle Assessment of the best solutions)
2. Recovery of specific metals compared to conventional processes leading to expected **significant impacts on the resource efficiency**
3. Primary NPs production process and the downstream separation as one single, **integrated process** to be used in current existing plants/technologies at different scale (shorter time to market)
4. Development and evaluation of **new markets** for the effluent treatment industries (Life Cycle Cost Assessments) but also **multi-sectorial deployment** of the production and use of high value metallic NPs

CONTACT DETAILS



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Bacterial revalorization of precious metals from waste water

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