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R & I Europe

Release of Nanomaterials during their Life Cycle

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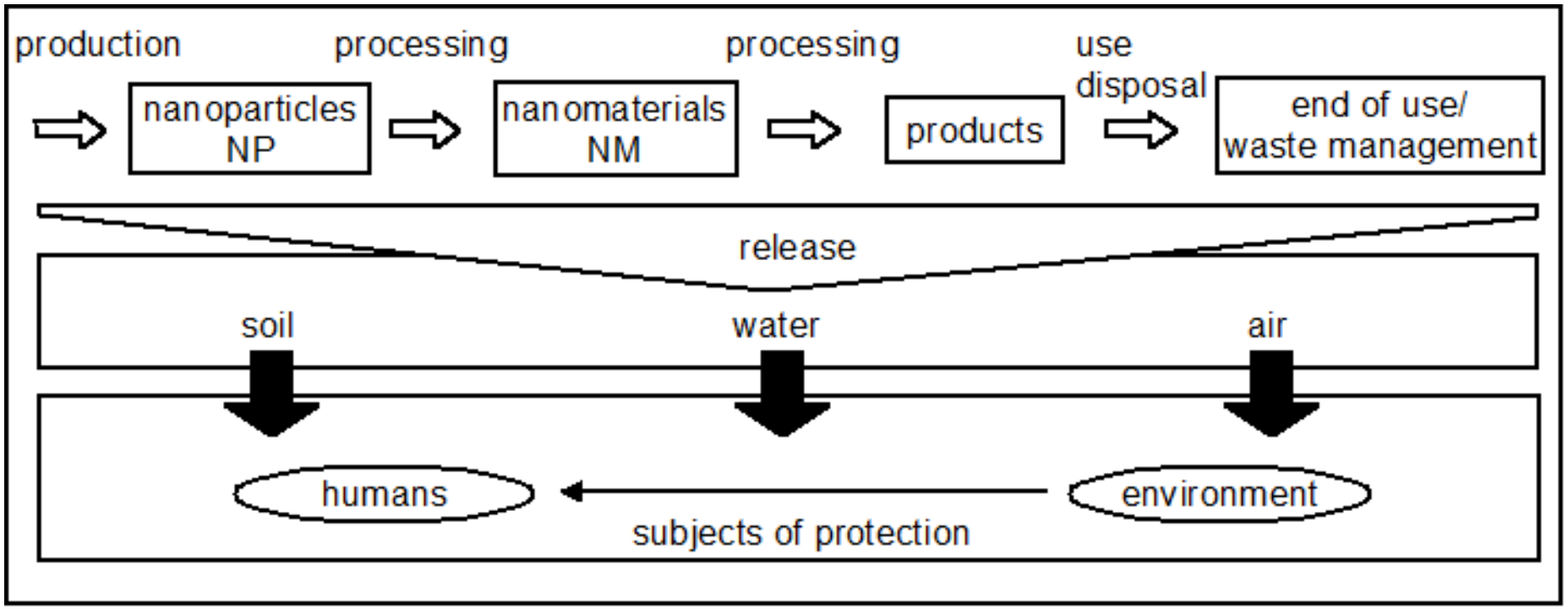
Release of nanomaterials during their life cycle

- Exposure towards engineered nanomaterials (ENM) is seen critical due to possible health implications
- Release is a pre-requisite for exposure but not systematically studied
- Release is possible during any stage of the life cycle



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- Release is possible during any stage of the life cycle

- Production and processing: most critical for workers
- During use: less defined, lab-simulations of typical processes
- End of life: often undefined and mixed with other materials

Processes leading to release

mechanical processes

- sanding
- drilling
- sawing
- milling
- cutting/shredding
- dustiness of powders
- mechanical shock
- wash off
- ……

thermal processes

- thermal stress
- incineration
- combustion
- …..

chemical processes

- reactive liquids / gases
- dissolution
- ……

mixed processes

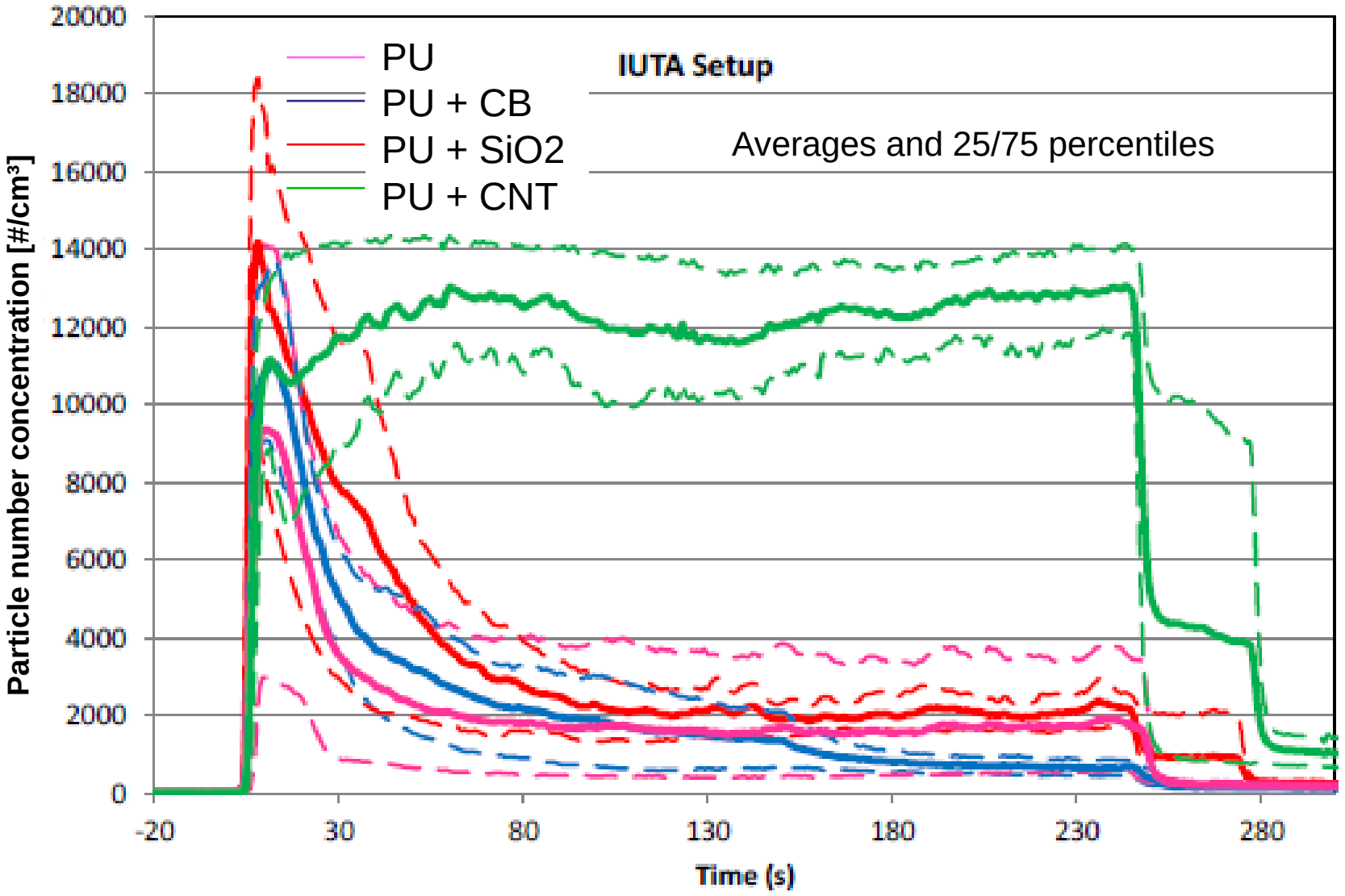
- weathering (degradation and abrasion)
- mechanical processes: thermal stress usually present

... **: studied during different (EU) projects at IUTA**

Example for lab-simulation: sanding test rig

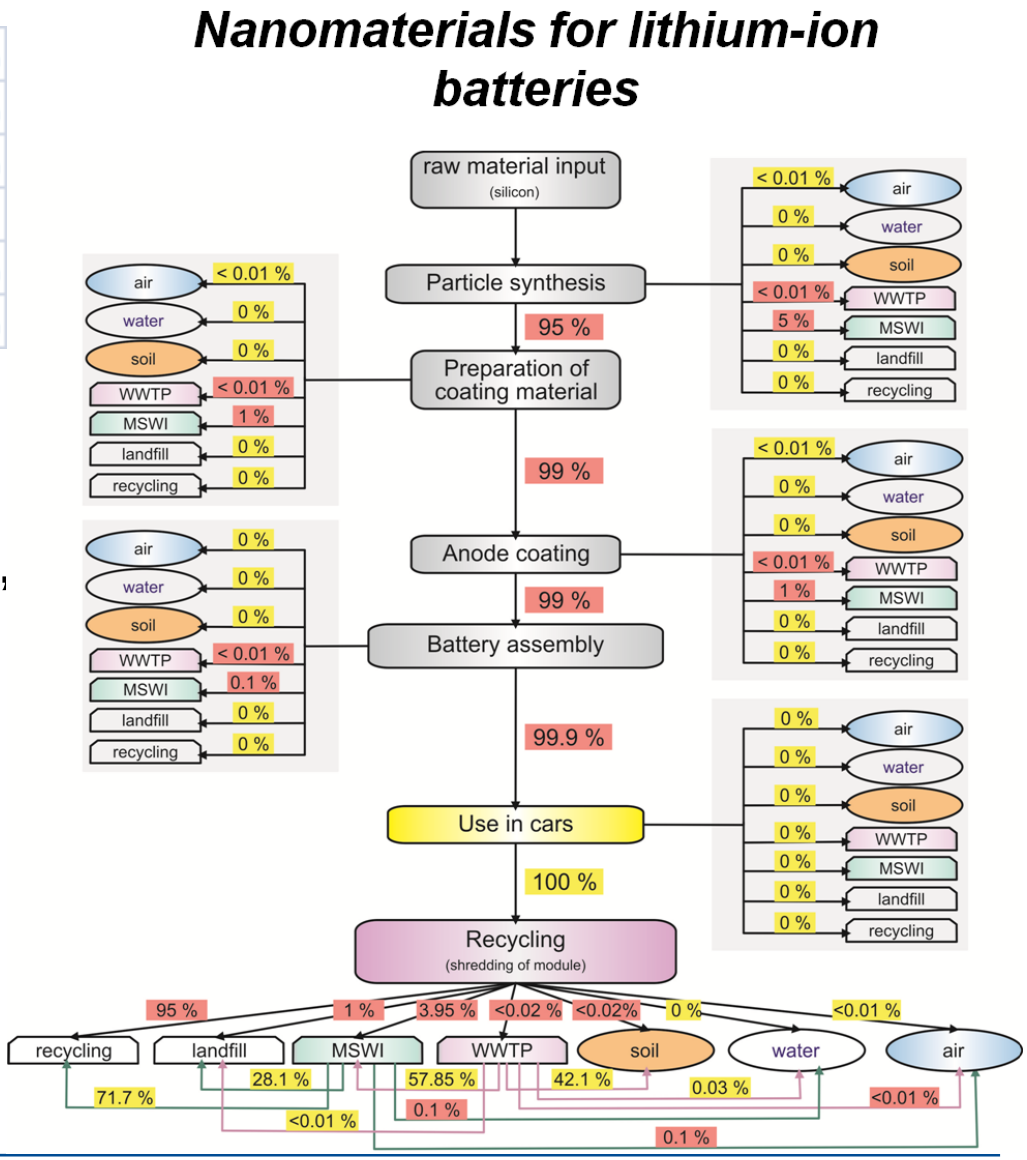
- Release/emission testing
- Variable test conditions (paper grit size, relative sanding speed, pressure)
- Tested for many different materials also in comparison with different abrasion/sanding testers

Example for lab-simulation: sanding of PU



Example for release along the life cycle

Air	0.05%
Water	0.01%
Soil	0.04%
landfill	3.93%
recycling	95.97%



- → Still many unknowns at certain life cycle stages, especially for use and recycling phase
- → Possibilities for future research
- → Looking for partners/projects

IUTA - Experience in international projects

running:

- BIORIMA, 4 years, 2017-2021 (H2020)
- NanoFASE, 4 years, 2015-2019 (H2020)

finished:

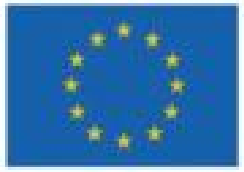
- FutureNanoNeeds, 4 years, 2014-2017 (FP7)
- BUONAPART E, 4 years, 2012-2016 (FP7)
- MARINA, 4 years, 2011-2015 (FP7)
- AirMonTech, 4 years, 2010-2014 (FP7)
- EnerGEO, 4 years, 2009-2013 (FP7)
- Nanodevice , 4 years, 2008-2012 (FP7)
- NanoImpactNet, 4 years, 2008-2012 (FP7)
- NETZ- Nanomaterials for Energy Applications, 4 years, 2009-2013

New partners searched:

- Research partners (industry and university) in the field of release and exposure assessment, life cycle analysis, behavior and fate of nanomaterials and advanced materials

Contact us at: **www.iuta.de**

Acknowledgements



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