

Topic P: Processing and Synthesis

## P07: Reactive nano-systems for advanced joining and disassembly - From fundamentals to applications

Self-propagating reactions cause rapid exothermic changes of phases, microstructure and shape of a reactive material. This opens up possibilities for their application in rapid, localized joining, e.g. in electronic packaging or dissimilar component joining. In addition, the controlled disassembly of components can be realized by incorporating a reactive material into a technological system during fabrication and its activation after end-of-life. This promotes material selective recycling of materials, contributing to sustainability and circular materials. However, current challenges lie in the control and of reactive properties such as velocity, temperature, ignition and structural changes as well as in the development of concepts for integration into technological systems.

Reactive nano-systems and materials structures may include nano mixtures, bi-metallics, multilayers, or structures obtained by mixtures of micro or nano particles and many more. They enable exothermic, self-propagating reactions. This symposium will highlight advances in the understanding, the preparation and application of such reactive nano-systems for joining and disassembly of composite materials and material systems, e.g., in microelectronics, electromobility or energy conversion and storage systems.

This symposium will bring together scientists and engineers interested in fundamental materials science issues that need to be addressed to develop advanced and novel reactive materials systems and their next-generation applications in joining and disassembly processes. Areas without limitations are for example:

- Fundamentals of reactive nano-systems
- Preparation of reactive nano-systems
- New reactive systems
- Advanced Processing with reactive materials (joining, disassembly)
- Reactive thin films or reactive powders
- Advanced Characterization techniques (nanocalorimetry, structural characterization, mechanical testing)
- In situ advanced characterization methods
- Modeling of ignition and reaction mechanisms
- Multiscale modelling and diagnostics
- Safety and Handling of Reactive Materials
- Environmental Impacts and Sustainability of reactive nano-systems
- Applications and devices

### Symposium Organizer



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