

Intelligent and adaptive materials and structures		
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Summary		
E2.II	<p>Intelligence of materials and structures implies an inherent ability to respond to stimuli in a coordinated manner, including variations in reaction that could depend e. g. on situational context. Adaptivity is a more general term and calls for a less conscious response. Sensorial materials and adaptive metacomposites conform to the first definition: They incorporate sensing and/or actuation capabilities as well as elements like data processing, communication and energy supply. Their complexity calls for a top-down approach in their realization. Current bottom-up approaches mainly aim at hard-wiring a defined reaction to certain conditions. Self-X materials fall into this second category, with self-healing as the subtype currently developed furthest. The present symposium aims at combining contributions on both classes of materials and structures, assuming that they represent two ends of the same spectrum. Benefits for transportation lie in contributions to increased safety via direct response to or up-to-date knowledge on e.g. structural state, reduced weight of safety-critical structures based on availability of such features and limited costs by facilitating concepts like need-based and predictive maintenance.</p> <p>The symposium will cover several aspects of such materials and structures, including e.g.</p> <ul style="list-style-type: none"> ○ General concepts like Sensorial Materials or Adaptive Metacomposites specific solutions adapted to metallic, polymer or fibre reinforced plastic host materials ○ Adv. solutions for structural sensing, incl. intrinsic sensorial properties of structural materials ○ Sensor/electronics integration (link to E24) and compliant sensor/electronics techniques, including e. g. MEMS/NEMS on flexible substrates ○ Real-time data evaluation and system identification approaches (link to E21) ○ Simulation approaches covering conventional structural and intelligent features (link to E21) ○ Exploring potential links between bottom-up/self-X and top-down/hybrid integration approaches towards intelligent materials and structures 	