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## ACCEPTED MANUSCRIPT

#### Development of adaptive hinged fiber reinforced plastics based on shape memory alloys

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#### Abstract

This paper presents the development of adaptive hinged fiber reinforced plastics based on structurally integrated shape memory alloys. To realize this novel smart structure, hinged preforms are realized, shape memory alloys are converted into actuating hybrid yarns with tailored adhesion properties using the friction spinning technology, the hybrid yarns are integrated on the surface of the hinged preforms by tailored fiber placement and finally the hybrid yarn integrated hinged preform is infiltrated by a suitable thermoset resin. Additionally, the deformation behavior of adaptive hinged fiber reinforced plastics is tested and results are evaluated with regard to quasi-static and dynamic aspects. The maximum deformation and the hinge width of adaptive fiber reinforced plastics and the meander distance of the hybrid yarn embedded in it.

#### Keywords

Polymer-matrix composites; Smart materials; Thermomechanical; Lay-up

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