MULTIFUNCTIONAL SENSOR FOR COMPOSITE MATERIALS

Context

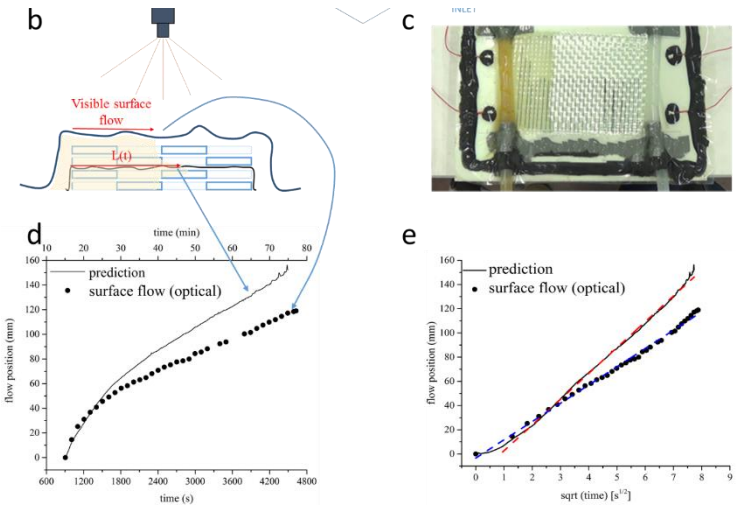
There is an ever increasing interest in structural composites as light-weight materials for application in transport, wind power, and sporting goods, amongst other sectors. The global demand for composites end products has steadily increased from 22.2$ billion in 2015, with 50 % of the weight of the last generation of commercial airplanes (Boeing 787 or Airbus A382 and A350) consisting of composites.

Emerging strategies to reduce the cost of structural composites require the use of novel, non-invasive sensors that can help improve fabrication processes an extend the lifetime of structural composite elements. There is particular interest in sensors that are flexible, tough and can operate through electrical (rather than optical) stimuli.

Technology description

Multifunctional sensor for low-cost fabrication of composite components by vacuum infusion process.

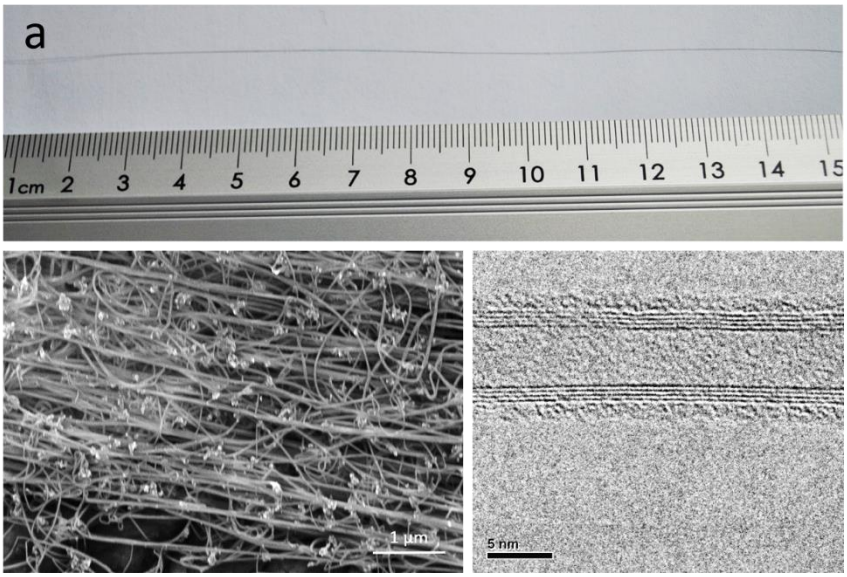
How it works: The thin sensor is laid between dry fabric layers and connected to a simple electrical power meter. During resin infusion and curing, the sensors provides real-time information about the resin flow and the gel point. After curing the sensor remains embedded in the composite and can be used for structural health monitoring (SHM) and damage detection.



Technology advantages

Non-invasive. The sensor is thinner than a human hair.
Robust. The sensor is tougher than steel.

Simple. Operates with electrical stimuli



Supplementary data

Application: Fabrication and HSM of composite materials
Intellectual property rights: P201730828 Patent application in Spain. Priority date 22/06/2017
Transfer Opportunity: License of technology

References:
A composite fabrication sensor based on electrochemical doping of CNT yarns; Advanced Functional Materials; 2016, 26(39), 1616-3028;
A piezoresistive sensor based on carbon nanotube yarns; NDT.net: Proceedings from EWSHM 2016; 2016, 21(8);

Contact

Knowledge & Technology Transfer Department, IMDEA Materials Institute
techtransfer.materials@imdea.org
0034 91 5493422