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# Shear-deformed fabric sensor made of P(VDF-TrFE) for damage detection of draped composite structures: A feasibility study

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## ABSTRACT

For the damage detection of complex-shaped composite structures fabricated by vacuum bag degassing molding with a draping process, a fabric sensor made of poly(vinylidene fluoride-trifluoroethylene), was constructed. Characterization of the fabric sensor by picture frame tests and an electromechanical test was carried out. The locking angle of the fabric sensor was around 30º, and the static sensitivity of the sensor increased with the shear angles owing to an overlapping effect. Subsequently, low-velocity impact tests were performed by using a drop-weight impact machine (2.35 J–7.06 J) to confirm the feasibility of the P(VDF-TrFE) fabric sensor for the damage characterization of the composite dome structures. As the first step of health monitoring method with a new type of sensor an estimation technique for the potential failure of the composite structures was suggested by considering the relationships between the impact energy and voltage signals from the fabric sensors.

**Keywords**: A. Fabrics/textiles; A. Smart materials; B. Impact behavior; C. Damage mechanics.

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