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## **Plasma polymerized coating as a protective layer of carbon nanotubes grafted carbon fibers**

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Carbon fiber reinforced composites are particularly used in extreme conditions, as in aerospace, rather than conventional materials. They are characterized by higher tensile properties and electrical energy dissipation as well as light weight structure. One of the key points of their properties is the interface between the matrix and the fibers.

In order to improve composite properties in this area, another outstanding reinforcement is added: carbon nanotubes (CNT). It was chosen growing CNT directly on carbon fibers by the Chemical Vapour Deposition (CVD) method. To prevent any unexpected CNT release during fiber handling and composite life time, a protective coating is necessary. A coating based on an organic compound is applied on hybrid fibers (CNT grown on fibers) by cold plasma polymerization.

Our study deals with the nature of the coating, its morphology and its role at the fiber/matrix interface using ESCA, SEM FEG and fragmentation techniques. Protective role of coating on CNT grafted fiber is investigated and furthermore its influence on both mechanical and electrical properties of fibers. The chemical structure of layer shows monomer and fragmented forms. Also uniform coating on fibers is observed. Unchanged electrical conductivity and "unreleased CNT" grafted fiber will be discussed.

### **Keywords**

Cold plasma deposition

Organic monomer

Carbon nanotubes grafted Carbon fibers

Thin layer

Mechanical and electrical properties