

Sizing Agent for Improving Adhesion between Carbon Fibers and Polyester/Vinyl Ester Resins

Disclosure Number

201303045

Technology Summary

Carbon fiber reinforced plastics (CFRP), also called carbon fiber composites, provide desirable mechanical properties and low density. For this reason, such materials have been used in sundry applications, such as space and aeronautics industries, military equipment, transportation, civil and chemical engineering, and sports and recreation goods. Carbon fiber composites are especially used in the aerospace and aeronautics industries when the required mechanical properties have to be exceptional. However, the price of carbon fibers is decreasing and their use is increasing, spreading into an ever wider range of applications. Specific demands related to mechanical properties, resistance to chemicals and environment (e.g. moisture, saltwater, and pollution), process and cost of manufacture have led to an investigation of the use of different types of matrices. Vinyl ester resins are widely used, particularly because of their competitive price, their hand-ability and their high resistance to moisture absorption and corrosion. Nevertheless, the mechanical properties of carbon fiber–vinyl ester composites cannot currently compete with the mechanical properties of carbon fiber–epoxy composites, due to their poor mechanical interfacial properties and low interfacial adhesion. Indeed, it is generally admitted that the degree of adhesion between fiber and matrix is a critical factor determining the mechanical performance of fiber-reinforced composites. The present invention comprises coating (sizing) compositions that promote the interface adhesion between fiber/matrix.

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