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Topic of the Speech:

The Mechanical Properties of Carbon/Aramid Composites with Three Different Molding Methods

Professor Seung Kook An

Pusan National University
Korea

Professor Seung Kook An obtained his Ph.D. at the Fiber and Polymer Science Program, North Carolina State University in 1992. He got MS degree at the Department of Textile Engineering, Chemistry, and Science, North Carolina State University in 1988. After working at National Industrial Research Institute for two years, he had been a professor of the department of Organic Material Science and Engineering at Pusan National University until 2020. He served as a director of Research Institute of Industrial Technology from 2011 to 2013, and has been the director of RIS in textile material for transportation vehicle from 2011. He has been the chairman of Korea Association of Tech Textile Industry (KATTI) from 2017. He served as the Korean delegate for ISO TC94/SC13 and ISO TC94/SC14 for 20 years. He served as a Vice President of Korean Fiber Society in 2010 and 2018.

His research areas are protective clothing, physical properties of industrial textile products, comfort properties of industrial fabrics, and production technology of multifunctional flame resistant interior textile products.

ABSTRACT SUBMISSION
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The Mechanical Properties of Carbon/Aramid Composites with Three Different Molding Methods

Seung-Kook An[1*]
[1]*Dept. of Organic Material Sci. and Engineering, Pusan National University, Busandaehak-ro 63-2, Busan 46241, Korea*
[*]Presenter's email: ansk@pusan.ac.kr

ABSTRACT (NO MORE THAN 500 WORDS:)

Since fiber reinforced composites can withstand extreme environments and have many advantages in terms of weight reduction due to their low weight and high strength, they are particularly applied to a wide range of industrial fields as well as aerospace and transportation fields. Factors that increase the mechanical properties of fiber composites include differences in materials, but molding methods and conditions can also have a major impact. In this study, carbon, aramid, and carbon-aramid interlayer hybrid composite materials were molded using carbon and aramid fiber prepregs to confirm the differences in mechanical properties of composite materials according to molding methods of auto-clave, hot press and dry oven. As a result of evaluating the mechanical properties of the three molding methods, hot press molding in aramid or hybrid composite materials can bring improvement in flexural strength and impact strength compared to auto-clave and dry oven (both are vacuum bag moldings). It was confirmed that it is necessary to use a suitable mold for the product because it can bring about the external separation phenomenon of the laminate and the deformation of the fabric shape of each laminate. Therefore, vacuum bag molding, which can maintain the laminated form of each laminate without significantly lowering the strength, can reduce the variation in mechanical properties. In addition, in the case of the carbon specimen, it was confirmed that the strength increased according to the pressure, and the elongation was not changed. But the aramid and hybrid specimens showed lower strength and elongation again under a high pressure. Therefore, considering various mechanical properties exhibited in the experiments, vacuum bag molding is deemed the most stable process to achieve desired mechanical properties in composite materials. Moreover, when using auto-clave, it is considered to manufacture the best product by pressurizing with an appropriate pressure according to the materials. Such molding conditions will bring efficiency to parts production in various transportation equipment industries such as automobiles, ships, and aircraft and improve fuel economy.