NANOCOMPOSITES FOR AIRCRAFT APPLICATIONS

R. Prabhakaran
Eminent Professor
Department of Mechanical and Aerospace Engineering
Old Dominion University
Norfolk, VA 23529, U S A
Email : rprabhak@odu.edu

Abstract

The steady increase in jet fuel prices in recent years has accelerated the quest for greater economy in airline operations. While improvements in aerodynamic efficiency, engine fuel efficiency, etc., have been sought, lighter and stronger materials for aircraft structural components remain a very important goal. The percentage of advanced composites, utilizing carbon fibers, in modern aircraft has reached 50 percent. The trend now is to use nano reinforcements such as graphene and carbon nanotubes to further reduce the structural weight. Due to the difficulties in fabricating nanocomposites with a high enough volume fraction of nano reinforcement, the nano reinforcements are either added to the polymer matrix or grown on the carbon fibers. The nano reinforcements are multi-functional; thus, in addition to contributing strength, they contribute to other properties such as electrical conductivity which in turn enhances the lightning strike protection, electrostatic discharge, electromagnetic shielding, etc. This paper summarizes these aspects and also describes the applications of nanocomposites in aircraft interiors, brake components, aircraft repair, etc.

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