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Investigation of nanocomposites manufactured with carbon nanofiber functionalized via ionizing radiation

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In aerospace industry, Carbon nanofibers (CNFs) Pyrograf III have been investigated for the manufacture of nanocomposites. CNFs have excellent physical and chemical properties with low cost production however the functionalization of the surface is necessary to enhance the dispersion and tailor CNF to the host polymer. To this end, CNF surface was functionalized with acrylic acid (AA) via ionizing radiation process with objective to introduce functional groups on its surface, which may promote good interface between CNF and epoxy resin system. Nanocomposites were manufactured by two different methodologies of CNF dispersion in epoxy system. Three roll milling methodology promoted better dispersion due to the powerful shearing forces. Nanocomposites manufactured with CNF functionalized with AA 20wt% solution via gamma irradiation presented better mechanical property as well as highest fiber matrix contact angle.