

Microfluidization for Processing of Carbonized Chicken Feather Fiber (CCFF) Modified Epoxy Suspensions and the Thermal Properties of the Resulting Composites

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Abstract : In this study, microfluidization was considered a promising approach to breaking up of carbonized chicken feather fibers (CCFFs) flocs to synthesizing epoxy suspensions containing (1 wt. %) CCFFs. For comparison, CCFF was also treated using sonication. The energy consumed to break up CCFFs in the ethanol was the same for both processes. CCFFs were found to be dispersed in ethanol in a significantly shorter time with the high shear processor. The CCFFs treated by both sonication and microfluidization were dispersed in epoxy by sonication. SEM examination revealed that CCFFs were broken up into smaller pieces using the high shear processor while being not agglomerated. Further, DSC, TMA, and DMA were systematically used to measure thermal properties of the resulting composites. A significant improvement was observed in the composites including CCFFs treated with microfluidization.

Keywords : carbonized chicken feather fiber (CCFF), modulated differential scanning calorimetry (MDSC), modulated thermomechanical analysis (MTMA), thermal properties

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