Enhanced Buckling Resistance in Composites through Graphene Nanofillers

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ABSTRACT

Buckling properties of nanocomposites with different types of nanofillers such as single-wall carbon nanptube, multi-wall carbon nanotube and graphene platelet at the same filler content of 0.1% weight fraction was experimentally and theoretically studied. There was a large amount of increase up to 52% in critical buckling load with addition of only 0.1% weight fraction of graphene sheets into the epoxy polymer matrix. Additionally, the theoretical predictions of the critical buckling load of graphene nanocomposites show around 32% increase using the classical Euler-buckling theory. Thus, discrepency between the measured experimental data and theoretical predictions, suggests an enhancement in the load transfer effectiveness between the polymeric matrix and the graphene fillers under compressive loads. Such graphene nanocomposites with high buckling stability show promise for structural elements in aeronautical, space, automotive and energy applications.