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Abstract

A carbon/carbon hybrid nanofiller based on nanodiamond-decorated graphene oxide (ND@GO) was designed using 4,4'-methylene diphenyl diisocyanate as the coupling agent and incorporated in carboxylated styrene-butadiene rubber (XSBR) for fabricating XSBR/ND@GO nanocomposites. The morphology and structure of the designed ND@GO nanofiller were investigated comprehensively. A modified latex compounding method was employed to fabricate the rubber/ND@GO nanocomposites to ensure a homogenous dispersion of the nanofiller in the polymer matrix, which was confirmed by high-resolution scanning electron microscopy. The mechanical properties, thermal stability, dynamic rheological, and dynamic mechanical properties of the XSBR/ND@GO nanocomposites were studied. The as-prepared XSBR/ND@GO nanocomposites exhibited superior mechanical properties, thermal stability, and thermo-physical properties attributing to