Large Strain Sensing Properties of Multi-walled Carbon Nanotube/Natural Rubber Composites (Postprint)

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Date: 2023-06-21T00:00:00+00:00

Abstract

A multi-walled carbon nanotube modified natural rubber composite was prepared, wherein the surfactant cetyltrimethylammonium bromide (CTAB) was incorporated during the preparation process to improve the dispersion of carbon nanotubes in the rubber matrix, thereby reducing the percolation threshold of carbon nanotube content and more effectively constructing conductive networks. Experimental investigations revealed that the tensile strength and stiffness of the composite increased with increasing carbon nanotube content; the material's resistance/strain sensitivity factor reached its maximum at a carbon nanotube content of 4%; under cyclic loading, the resistance and strain varied synchronously and stabilized after a certain number of cycles, exhibiting high-sensitivity and high-stability response characteristics, which demonstrates the composite's suitability for strain monitoring and sensing applications in large-deformation structures.

Full Text

Preamble

1. Introduction

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2. Methods

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3. Results

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4. Discussion

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References

Note: Figure translations are in progress. See original paper for figures.