

Polymer Composites with Nanoscale Additives for Strain Gauge Applications: a Brief Review

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Abstract. The article discusses various types of polymer composites with nanomaterials that are intended for strain measurement tasks. Despite the obvious advantages of strain gauges based on polymers modified with dispersed conductive structures, there are problems in creating effective ones that can operate under large deformations with high sensitivity and measurement accuracy. This can be realized by implementation of the strain gauge self-compensation effect when combining a semiconductor material (with negative temperature coefficient of resistance) with high calibration coefficient and metal (with positive temperature coefficient of resistance) as well as improved lifetime characteristics allowing for long-term operation with multiple compression/decompression modes. Carbon nanotubes play an important role in the technologies to create polymer composites for strain measurement tasks. It is also possible to change the properties of such composites by varying the type of polymer matrix. This paper analyzes various designs of strain gauges, as well as methods of calculation and modeling of their performances.

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