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Polymer composite structure for fuel cells

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Abstract

Fuel cell was intensively researched in the last several decades with a variety of targeted applications ranging from micro devices to large-scale spacecraft power supplies. For both academics and industries, one of the most challenges in fuel cell design and fabrication is the material to be used in the structure.

Therefore this research is focused on designing and testing carbon black or silver filled thermalset composites with high electrical conductivity, as well as suitable thermal, mechanical and process properties.

In this study, polymer composites were developed with PDMS (polydimethylsiloxane) and two different types of conductive fillers, carbon black and silver. The effect of introducing these fillers in the polymer for varies properties have been investigated. Research was conducted through laboratory experimental setups that include thermal conductivity, thermal stability, electrical conductivity, dynamic mechanical property. The particle size and dispersion was studied with SEM (Scanning Electron Microscopy). The results were presented and discussed. Certain issues still exist before the developed polymer composite can be applied in an industrial fuel cell design and the possible future research work has been suggested.