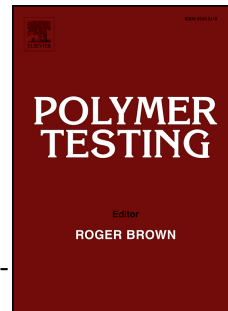


# Accepted Manuscript

Electrical and thermal conductivity of ethylene vinyl acetate composite with graphene and carbon black filler

Sohrab Azizi, Eric David, Michel F. Fréchet, Phuong Nguyen-Tri, Claudiane Ouellet-Plamondon



PII: S0142-9418(18)31325-4

DOI: [10.1016/j.polymertesting.2018.09.031](https://doi.org/10.1016/j.polymertesting.2018.09.031)

Reference: POTE 5629

To appear in: *Polymer Testing*

Received Date: 20 August 2018

Accepted Date: 28 September 2018

Please cite this article as: S. Azizi, E. David, M.F. Fréchet, P. Nguyen-Tri, C. Ouellet-Plamondon, Electrical and thermal conductivity of ethylene vinyl acetate composite with graphene and carbon black filler, *Polymer Testing* (2018), doi: <https://doi.org/10.1016/j.polymertesting.2018.09.031>.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Material Properties

**Electrical and thermal conductivity of ethylene vinyl acetate composite with graphene and carbon black filler**Sohrab Azizi<sup>1</sup>, Eric David<sup>1</sup>, Michel F. Fréchet<sup>1</sup>, Phuong Nguyen-Tri<sup>1,2</sup>, Claudiane Ouellet-Plamondon<sup>1\*</sup><sup>1</sup> École de technologie supérieure (Université du Québec), Montréal, QC, Canada<sup>2</sup> Department of Chemistry, Montreal University, Montréal, QC, Canada**Abstract**

Ethylene vinyl acetate (EVA) composites, including two different carbonaceous conductive fillers, carbon black (CB) and commercially available graphene (G), were fabricated by solvent-casting and melt compounding methods. The effect of additives and process conditions on electrical and thermal properties of composites was investigated. The dielectric responses of EVA composites were characterized by a percolation threshold of 15 wt % for EVA/G prepared by solvent-casting. However, as the EVA/G15% was also subsequently extruded, the applied shear stress induced by extrusion caused deterioration of the electrical network and reduced the composite's electrical conductivity. A percolating network was found for the EVA composites containing CB at around 5-7 wt % with 10 orders of magnitude increase in electrical conductivity with respect to the neat EVA. The thermal conductivity of EVA/CB7% and EVA/G15% increased 16 and 22 % respectively, in comparison to the neat EVA. Both additives increased the electrical and thermal conductivity of composites to be appropriate as jackets for high-voltage cables.

**Keywords:** Electrical properties; Thermal conductivity; Ethylene vinyl acetate; Carbon black; Graphene.

---

\* Corresponding author: Department of construction engineering, École de technologie supérieure (ÉTS), Université du Québec, 1100 Notre-Dame St W, Montréal, QC H3C 1K3 Canada.  
Email address : Claudiane.Ouellet-Plamondon@etsmtl.ca

Download English Version:

<https://daneshyari.com/en/article/11020173>

Download Persian Version:

<https://daneshyari.com/article/11020173>

[Daneshyari.com](https://daneshyari.com)