

Influence of ionic liquid on graphite/silver nanoparticles dispersion and antibacterial properties against *Escherichia coli* of PP/EPDM composite coatings

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First published: 13 November 2019

<https://doi.org/10.1002/app.48714>

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ABSTRACT

In this work, graphite doped with silver nanoparticles are synthesized and coated onto a PP/EPDM blend surface. Three nanoparticles deposition methods are used. In one method, the nanoparticles are directly deposited on previously corona discharge-treated TPO surface. Another method is by compression deposition of nanoparticles in a thin layer forming a segregated coating. In the last method, a nanoparticle-polymer composite is deposited and then treated by corona discharge to expose the deposited nanoparticles. These last two methods show excellent antimicrobial activity ($R = 2.8$ and 3.9 , respectively) and higher inhibition values (85% and 89% , respectively) against *Escherichia coli* strains. The effect of using HMIMPF₆ and BMIMBF₄ ionic liquids on particle dispersion and antibacterial activity against *E. coli* is evaluated. Using ionic liquids enhance the antibacterial activity (from $R = 3.9$ to 5.4) and inhibition rates (from 89% to 99.8%) of the samples. As a result, a thermoplastic elastomer (TPE) material with enhanced antibacterial properties against *E. coli* is obtained using ionic liquids, which offer significant promise as a material for medical applications. © 2019 Wiley Periodicals, Inc. *J. Appl. Polym. Sci.* **2020**, *137*, 48714.