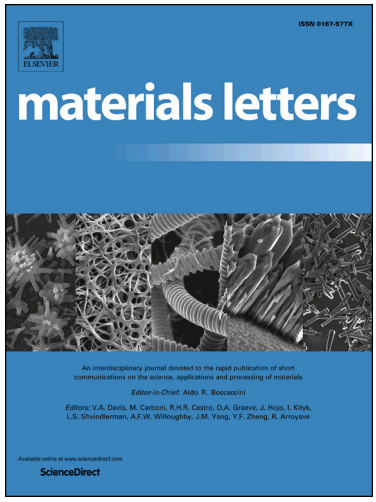

Fabrication of polymethylphenylsiloxane decorated C_{60} via π-π stacking interaction for reducing the flammability of silicone rubber

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ABSTRACT:

The free-radical trapping capability of buckminsterfullerene (C_{60}) inevitably inhibits peroxide vulcanization, which is one of the most challenges for its application in high temperature vulcanized silicone rubber (HTVSR). In this work, polymethylphenylsiloxane decorated C_{60} (PMPS-d-C_{60}) was fabricated via π-π stacking interaction and incorporated into HTVSR. It was found that PMPS-d-C_{60} not only overcame the negative effect of C_{60} on HTVSR vulcanization, but also effectively enhanced the flame retardancy of HTVSR. By adding only 4.0 phr PMPS-d-C_{60}, the limiting oxygen index of HTVSR was increased to 29.0%, and its peak of heat release rate was reduced more than 32%.

Keywords: silicone rubber; fullerenes; flame retardancy; free-radical quenching; nanocomposites

1. Introduction

Silicone rubber (SR) is widely used in the field of electronics and electrics due to its excellent high-temperature resistance and electrical insulation. Nevertheless, the flammability of