

Reduction of electromagnetic interference using ZnO-PCL nanocomposites at microwave frequency

ABSTRACT

In industrial equipment and home appliance applications, the electromagnetic compatibility compliance directive (ECCD) demands that electromagnetic interference side effects be eliminated or marginally minimized. The equipment must not disturb radio and telecommunication as well as other appliances. Additionally the ECCD also governs the immunity of such equipment to interference and seeks to ensure that this equipment is not disturbed by radio emissions when used as intended. Many types of absorbing materials are commercially available. However, many are expensive and not environmentally friendly. It is in the light of the above that we studied the electromagnetic absorption properties of ZnO-PCL nanocomposites prepared from cheap and abundant resources which are environmentally friendly (zinc and polycaprolactone). The test was carried out using a microstrip, open ended coaxial probe, and vector network analyzer. Amongst other findings, result showed that the ZnO-PCL nanocomposite has the capability of attenuating microwave frequency up to -18.2 dB due to their very high specific surface areas attributed to the nanofillers at 12 GHz.

Keyword: Reduction; Electromagnetic interference; ZnO-PCL nanocomposites; Microwave frequency