

## **Polymer magnetic composites able to shield electromagnetic radiation by absorption mechanism**

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### **Abstract.**

Nowadays, the quick development of wireless electronics and related wearable devices have caused the severe electromagnetic interference issue (EMI) or irradiation, which not only damages to the electronics, e.g. irreparable loss of valuable stored data, signal interruption etc, but also deteriorates the human health. Hence, extensive efforts are being made to fabricate the electromagnetic shielding materials that efficiently solve these negative influences. The desirable EMI shielding materials are requested to own a big shielding effectiveness ( $SE_T$ ), thin thickness ( $d$ ) and simultaneously behave lightweight feature. Among these candidates, ferrite-containing materials have been the focus of attention. Polymer composites filled with a suitable type of ferrite fillers are able to achieve a high proportion of total protective effect by the absorption mechanism.

The study was aimed at the preparation of elastomeric composite materials and evaluation of the influence of manganese-zinc ferrite on physical–mechanical, and electromagnetic shielding properties of magnetic composites based on acrylonitrile–butadiene rubber. The results showed that tensile strength at break showed a downward trend. The hardness of composites increased with increasing content of filler. The achieved results revealed that all composites containing 200 phr or more filler exhibit sufficient absorption shielding. With the increase of filler content in composites, the absorption maxima and absorption shielding efficiency shift to lower frequencies.

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