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# PROCEEDINGS

# The Effect of Reduced Graphene Oxide on the Microstructure, Magnetic Properties, and Corrosion Resistance of NdFeB Magnets

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This work investigates the effect of adding reduced graphene oxide (rGO) as a milling agent on NdFeB magnets' microstructure, magnetic properties, and corrosion resistance. RGO was incorporated into NdFeB powder via mechanical milling for 7, 15, 30, and 45 minutes. X-ray diffraction (XRD) confirmed the presence of the Nd2Fe14B3.1 phase in all composites. Transmission electron microscopy (TEM) revealed that rGO adhered to the NdFeB particles as thin flakes, potentially hindering corrosion. Magnetic characterization showed a significant improvement in remanence (Br), intrinsic coercivity (iHc), and maximum energy product (BHmax) for magnets produced with longer milling times (30 and 45 minutes). Notably, magnet-3 (30 minutes milling) achieved a Br of 1.10 T, iHc of 972.59 $kAm^{-1}$, and BHmax of 221.62 kJ $m^{-3}$, exceeding those of other samples and approaching values reported in the literature [1]. Electrochemical Impedance Spectroscopy (EIS) analysis demonstrated superior corrosion resistance in magnets fabricated with longer milling durations, likely attributable to the protective influence of rGO. This research underscores the potential of utilizing rGO as an environmentally friendly and efficient milling agent to increase the performance of NdFeB magnets

[1] Filho, J.C.S., Silva, S.C., Takiishi, H. et al. A New Method of Neodymium-Iron-Boron Magnets/Reduced Graphene Oxide Manufacturing Without a Controlled Atmosphere. JOM (2024). https://doi.org/10.1007/s11837-024-06525-2