# Comprehensive Structural Analysis of Gamma Irradiated Carbon Nanomaterials

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Gamma irradiation as a valuable technique enables structural modification such as introduction of desired functional groups and surface properties enhancement, expanding the potential applications of carbon nanomaterials in various fields. A study on gamma irradiation interaction with carbon nanostructures was conducted to investigate and unlock their full application potential. Three carbon samples (multiwalled carbon nanotubes – MWCNTs, graphene – G, and hybrid – MWCNTs/G) irradiated with gamma rays in different doses (50, 100, 250 and 500 kGy) in argon atmosphere were characterized and compared. In order to acquire a thorough understanding of the samples' structure, the following physical characterization techniques were employed: differential scanning calorimetry (DSC), thermogravimetric analysis/derivative thermogravimetry (TGA/DTA), elemental analysis, and scanning electron microscopy (SEM). Selected techniques were utilized to gather detailed information about the samples' composition, thermal behavior, and surface morphology, facilitating a comprehensive analysis of their structural properties and changes owing to the gamma irradiation treatment.

**Keywords**: carbon nanomaterials, multiwalled carbon nanotubes, graphene, gamma rays, irradiation, ionization