The performance of ion irradiated multi-walled carbon nanotubes-based filters for methylene blue removal from water resources

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In the current investigation, the irradiation of the multi-walled carbon nanotubes (MWNTs-TM) is conducted to enhance the adsorption potential applications. Multiwalled carbon nanotubes (MWNTs) were irradiated by He+ ions of the energy E=100 keV [1]. The irradiated tubes were investigated by scanning electron microscopy, and transmission electron microscopy to characterize the surface morphology of the irradiated MWNTs. Meanwhile, X-ray diffraction (XRD), and energy dispersive X-ray analysis (EDX) were employed to account for the structure and elemental composition, respectively. The data obtained from these investigations revealed a notable decrease in the diameter and length of the tubes. The adsorption efficiency of ion irradiated MWNTs was examined by removal of methylene blue from aqueous solutions. The results demonstrated that the removal percentage of the prepared samples could reach 85%. Irradiated MWNTs have greater surface area than pristine ones, which improves the efficiency of MWNTs-based filters for water purification applications. The ion irradiation process provides an effective approach to modify MWNTs and significantly control their adsorption efficiency.

REFERENCES

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