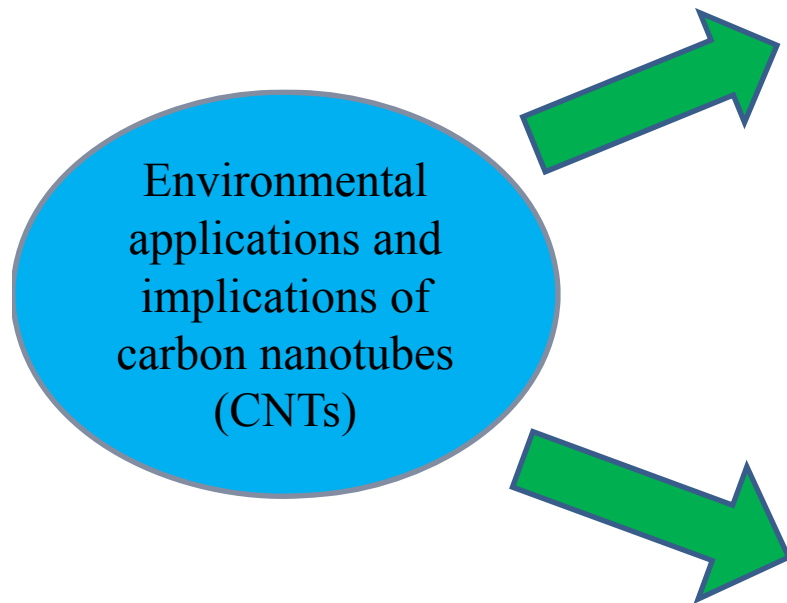


Effects of Cu(II) and Ni(II) Ions on Adsorption of Tetracycline to Functionalized Carbon Nanotubes

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Innovation Points



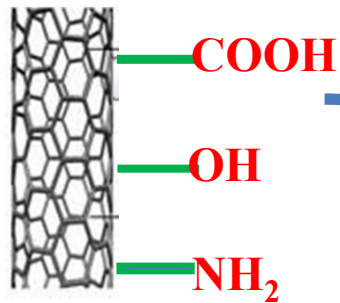
Environmental applications and implications of carbon nanotubes (CNTs)

To systematically investigate the adsorption properties of tetracycline to functionalized MWCNTs (G-MWCNTs, OH-MWCNTs, COOH-MWCNTs and NH₂-MWCNTs)

To understand the effects of metal ions on the functionalized MWCNTs-tetracycline

Mechanisms

Functionalized CNTs



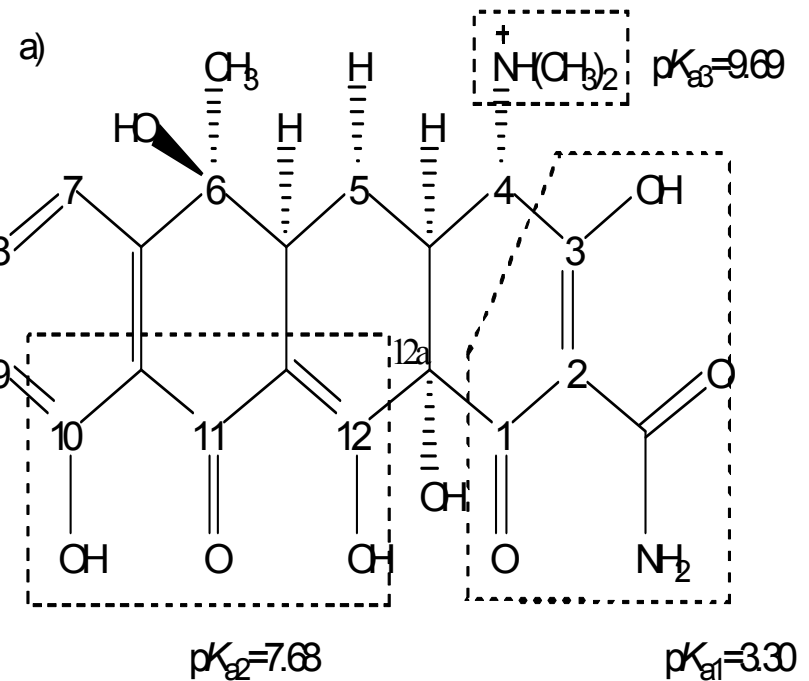
Graphitized CNTs



Strong adsorption

Cu(II) or Ni(II) : bridging

Chemical structure of tetracycline



Results and Findings

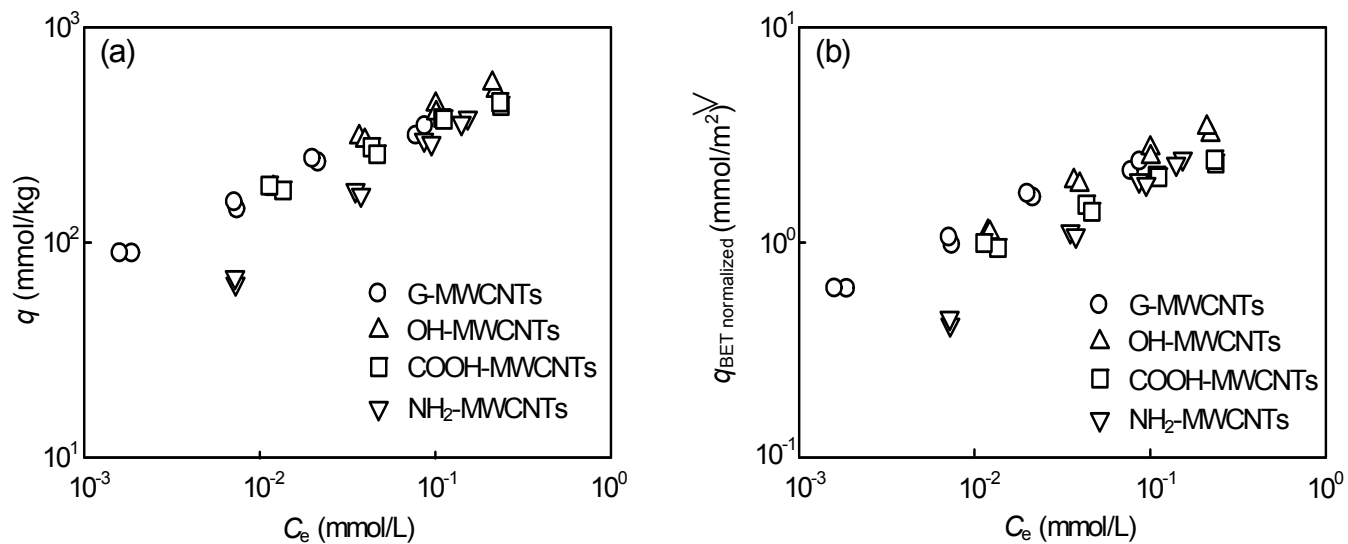


Fig. 2 Adsorption isotherms of tetracycline plotted as solid-phase concentration (q) vs aqueous-phase concentration (C_w) at adsorption equilibrium with different MWCNTs

(a) q on unit mass basis; (b) q on unit surface area basis

Results and Findings

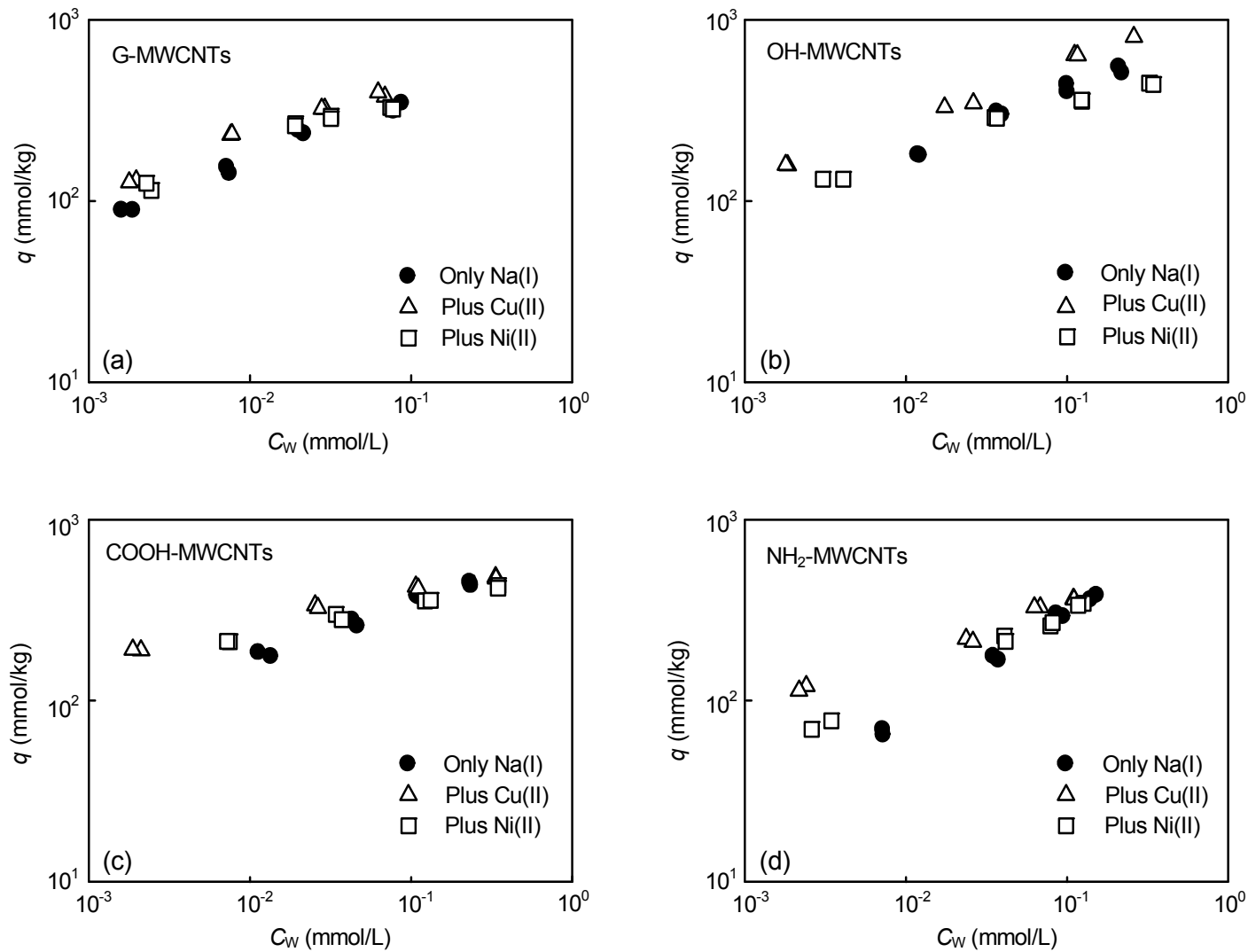


Fig. 3 Adsorption isotherms of tetracycline plotted as adsorbed concentration (q) versus aqueous-phase concentration (C_w) in electrolyte solution containing 0.02 mol/L NaCl only, and in the presence of Cu(II) or Ni(II) (initially at 0.1 mmol/L)

Results and Findings

Both Cu(II) and Ni(II) had a negligible effect on the adsorption of tetracycline to G-MWCNTs, but varied effects of the metal ions were observed for the three functionalized MWCNTs.

In general, Cu(II) exhibited a more pronounced effect for the adsorption of tetracycline than Ni(II), due to the degree of complexing capability.

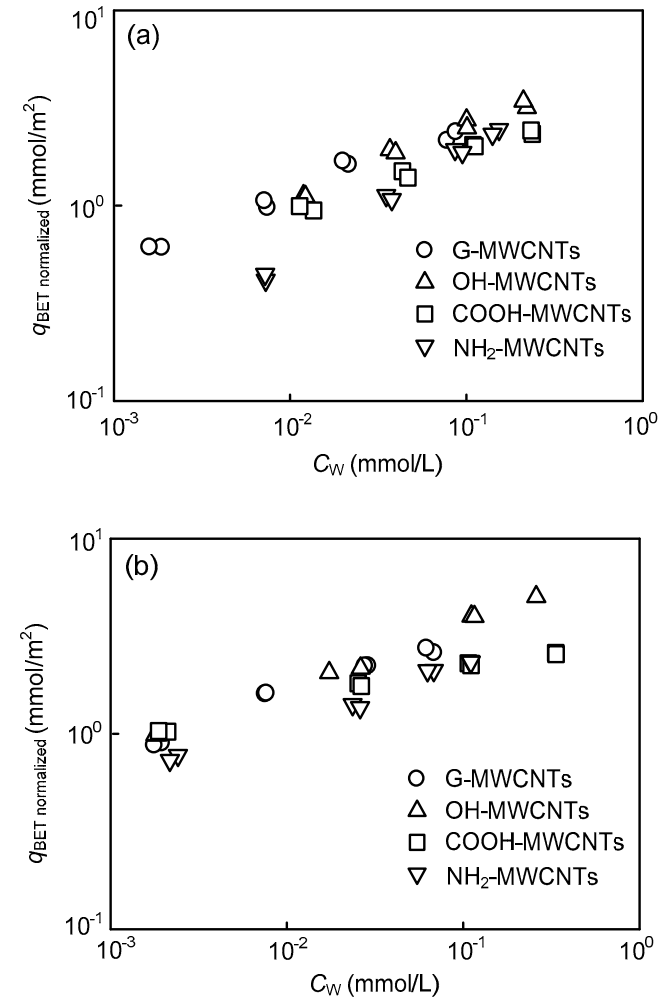


Fig. 5 Effects of Cu(II) on adsorption to different functionalized MWCNTs

(a) Only Na(I); (b) Plus Cu(II)