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# ZnO-Decorated MWCNTs as Solvent Free Nano-Scrubber for Efficient H<sub>2</sub>S Removal

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## Abstract

The present work was demonstrated to develop a solvent-free scrubber like zinc oxide-decorated multi-wall carbon nanotubes (ZnO-MWCNTs) to capture H<sub>2</sub>S at the ambient atmospheric condition in a laboratory scrubber set up. The resultant zinc sulfide-decorated multi-wall carbon nanotubes (ZnS-MWCNTs) is characterized by analytical techniques indicating facile conversion of ZnO to ZnS on the surface of MWCNTs. Surprisingly, synergistic effect of ZnO and MWCNTs indicates high H<sub>2</sub>S adsorption capacity of ZnO-MWCNTs at ambient temperature. Further, desulfurization performance in a realistic condition was employed using a bench-scale fixed bed reactor and seen that the ZnO-MWCNTs material showed the highest value of H<sub>2</sub>S removal (98%). Most importantly, regeneration process was developed for necessitates conversion of ZnS to ZnO by chemical method.

**Keywords:** ZnO, H<sub>2</sub>S-scrubber, Multiwall Carbon Nanotube, ZnS, Tail gas

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