

RE-USE OF PLASTIC WASTE AS SOLID-PHASE EXTRACTION SORBENT FOR PETROLEUM FINGERPRINTING ANALYSIS: NANOPOROUS ELECTROSPUN EXPANDED POLYSTYRENE- ZEOLITE FIBRE

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ABSTRACT

Huge amount of waste is generated annually from plastic wastes. Despite several effort in recycling, plastic wastes litter the environment. In view of this, it is essential to re-use these wastes in valuable industrial processes. For instance, the use of sorbent in sample preparation is crucial in the analysis of petroleum and its derivatives. Therefore, in this study, we investigate the potential of electrospun plastic waste (expanded polystyrene) and zeolite as sorbent in petroleum fingerprinting. The primary aim was developing a cheap sorbent for petroleum fingerprinting analysis. The potential of composite electrospun fibre as a sorbent for the solid-phase extraction (SPE) technique was investigated and its efficiency was compared with commercial alumina, silica and alumina/silica hybrid commercial cartridges for petroleum fingerprinting analysis. The chromatograms showed that the packed electrospun composite fibre demonstrated excellent cleaning and enrichment properties for SPE applications relative to the hybrid cartridges. This presents a novel re-use pathway for plastic waste (expanded polystyrene).

Keywords: crude oil; sorbent; fingerprinting; composite; hybrid; fibre