

## The recent development of inverse vulcanized polysulfide as an alternative adsorbent for heavy metal removal in wastewater

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### ABSTRACT

Inverse vulcanized polysulfides have been used as low-cost and effective adsorbents to remediate heavy metals in wastewater. Inverse vulcanization introduces sustainable polysulfide synthesis by solving the rapid desulfurization problem of unstable polysulfides, and provides superior performance compared to conventional commercial adsorbents. The review discussed the brief applications of the inverse vulcanized polysulfides to remove heavy metal wastewater and emphasized the modified synthesis processes for enhanced uptake ratios. The characteristics of polysulfide adsorbents, which play a vital role during the removal process are highlighted with a proper discussion of the interaction between metal ions and polysulfides. The review paper concludes with remarks on the future outlook of these low-cost adsorbents with high selectivity to heavy metals. These polysulfide adsorbents can be prepared using a wide variety of crosslinker monomers including organic hydrocarbons, cooking oils, and agro-based waste materials. They have shown good surface area and excellent metal-binding capabilities compared to the commercially available adsorbents. Proper postmodification processes have enabled the benefits of repetitive uses of the polysulfide adsorbents. The improved surface area obtained by appropriate choice of crosslinkers, modified synthesis techniques, and regeneration through post-modification has made inverse vulcanized polysulfides capable of removing.

### KEYWORDS

Inverse vulcanization; Porous polysulfides; Polysulfide adsorbent; Adsorption; Heavy metal removal

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