

Área: INO

Evaluation of MPTES - Functionalized Glass Waste as Catalysts in p-Nitrophenol Reduction

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Highlights

Functionalized glass spheres promoted the catalytic reduction of p-nitrophenol to p-aminophenol efficiently.

Recycled glass showed potential as a sustainable and low-cost catalytic support material.

Resumo/Abstract

The presence of persistent organic pollutants in industrial effluents, such as p-nitrophenol (PNP), has driven the search for sustainable treatment alternatives. This work aimed to evaluate the potential of recycled glass waste functionalized with 3-mercaptopropyltrimethoxysilane (MPTES) as catalytic supports for the reduction of PNP to p-aminophenol (PAP). White glass spheres were produced by conformation with sodium alginate, followed by sintering, acidification, hydroxylation, and functionalization with MPTES at different reaction times. The samples were characterized by FTIR, SEM, LIBS, and SLS analyses. FTIR spectra revealed bands associated with thiol groups, while LIBS confirmed the presence of sulfur (906 and 909 nm), indicating successful chemical modification. SEM micrographs showed homogeneous spherical structures with surface roughness alteration after functionalization, and SLS indicated an average diameter of approximately 25 μm . Catalytic assays monitored by UV-Vis demonstrated that functionalized glasses promoted the reduction of PNP, while the control test showed no significant activity. The results demonstrate that functionalized glass waste exhibits promising potential as a sustainable and low-cost catalytic material for the degradation of organic pollutants.

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