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Octopus-like PtCu nanoframe as peroxidase mimic for phenol removal

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Abstract: In this study, uniform octopus-like platinum-copper alloy nanoframes (OPCANs) were exploited as peroxidase mimics for phenol removal. The OPCANs exhibited excellent peroxidase-like catalytic activity with oxidant H₂O₂. Compared with the natural peroxidase horseradish peroxidase (HRP), OPCANs could catalyze H₂O₂ over a wider range of temperatures and pH values. Moreover, the OPCANs displayed a splendid phenol removal over 80% after a 30 min period of reaction.

Keywords: PtCu nanoframe, peroxidase, crystal structure, phenol removal, nanoparticles, biomimetic.

1. Introduction

Phenolic compounds are very important and useful substances for the production of medicine, chemicals and industrial commodities, such as aspirin and polyphenol, herbicides and pesticides, nylon and phenolic resins, paint, dyes and adhesives [1]. However, huge amounts of phenolic wastes presented in the industrial effluents pose great threats to aquatic environment and bring about serious health risks to humans. Among them, phenol is one of the dangerous carcinogens with serious toxicity and

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