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Review

# Exploring innovative approaches for enhanced performance of piezo catalysts

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## Abstract

This review has been researching ways to improve the efficiency of piezocatalysts for practical applications. We identified a research gap concerning the techniques to improve the energy conversion efficiency of piezo nanocatalysts in real-world scenarios. Our research did not yield any review articles summarizing these methods, so we focused on investigating strategies to enhance piezo catalysts. We found that coupling strategies that facilitate charge separation are a promising method for increasing efficiency and that an electrochemical synergistic coupling strategy improves the efficiency of piezo catalysts by enabling charge separation. Additionally, introducing defects and vacancies in piezo catalysts could be another method of enhancing their efficiency. Our findings show that a dopant may be added to improve the efficiency of piezo nanocatalysts. Furthermore, piezo nanocatalysts can also be enhanced by using electric polling and ferroelectric polarization, tailoring the morphology, coupling with plasmonic effects, and designing Z and S scheme piezo nanocatalysts. Energy conversion yield could be improved by 100% by applying these methods.