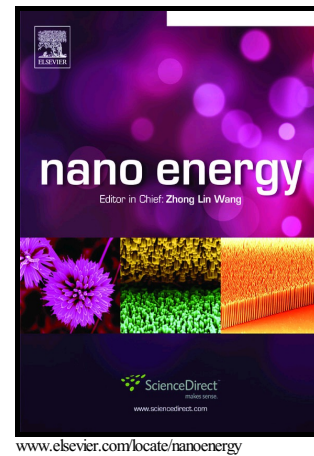


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# Effective enhancement of piezocatalytic activity of BaTiO<sub>3</sub> nanowires under ultrasonic vibration

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## Abstract

Piezocatalysis is a catalytic effect driven by the stress-induced electricity of piezoelectric crystallites. In this study, piezoelectric BaTiO<sub>3</sub> nanowires and nanoparticles were synthesized and their piezocatalytic activity was investigated. The BaTiO<sub>3</sub> nanowires exhibit effectively enhanced piezocatalytic activity under ultrasonic vibration compared with the BaTiO<sub>3</sub> nanoparticles. On the basis of the piezoelectric potential analysis by finite element method simulation for BaTiO<sub>3</sub> nanowires and nanoparticles under ultrasonic vibration, the enhanced piezocatalytic activity of the BaTiO<sub>3</sub> nanowires can be attributed to the larger piezoelectric potential along the polar axis. In addition, we also demonstrate that the intrinsic charge carriers (not piezoelectric charges) in piezoelectric crystallites play the role of charge transfer in the catalysis process through regulating the concentration of charge carriers. Our work provides further understanding of piezocatalysis of piezoelectric nanomaterials as well as insights on the relationship between piezoelectric potential and piezocatalysis.

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