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## Regular Article

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**Oxygen vacancies induced by zirconium doping in bismuth  
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**Abstract**

Doping with certain foreign metal ions in a photocatalyst might introduce surface defects (such as extrinsic oxygen vacancies), which can probably play an important role in the photocatalytic performance. In this work, oxygen vacancies were for the first time introduced into bismuth ferrite ( $\text{BiFeO}_3$ , denoted as BFO) nanoparticles by zirconium (Zr) doping, and the relationship between oxygen vacancies and the photocatalytic activity of Zr-doped BFO was investigated. It was found that the optical properties and the photocatalytic activities of Zr-doped BFO photocatalysts were significantly affected by the Zr doping amount. The Zr-doped BFO photocatalysts showed much higher photocatalytic

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