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## Oxygen-vacancy-modified brookite TiO<sub>2</sub> nanorods as visible-light-responsive photocatalysts

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### ABSTRACT

Brookite is the least studied TiO<sub>2</sub>, and its modification for improved photocatalytic activity remains a challenge because of the difficulties encountered in obtaining its pure form. Here, we report for the first time visible-light-active brookite (BT) nanorods with a high specific surface area and a large amount of oxygen vacancies, which are synthesized via a simple, one-step, surfactant-free, wet-chemical method. The oxygen vacancies of the BT nanorods facilitate absorption of visible light, and the absorption property could be tailored by post-annealing, without any significant change in the surface area and anisotropic morphology. BT nanorods annealed at 300°C show superior photocatalytic activity compared to anatase TiO<sub>2</sub> nanoparticles and other visible-light-active photocatalysts.

**KEYWORDS:** Brookite TiO<sub>2</sub>; Nanorod; Oxygen vacancy; Visible light; Photocatalysis

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