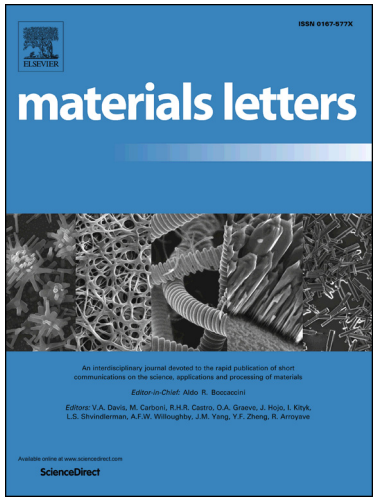

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Oxygen-vacancy-modified brookite TiO_2 nanorods as visible-light-responsive photocatalysts

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ABSTRACT

Brookite is the least studied TiO_2, 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_2 nanoparticles and other visible-light-active photocatalysts.

KEYWORDS: Brookite TiO_2; Nanorod; Oxygen vacancy; Visible light; Photocatalysis