Ruthenium oxide/tungsten oxide composite nanofibers as anode catalysts for the green energy generation of *Chlorella vulgaris* mediated biophotovoltaic cells


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**Abstract**

The development of electrochemically active and stable anode catalysts for the photoelectrochemical splitting of water molecules via biophotovoltaic cells (BPVs) utilizing microalgae receives a prime importance in green energy sector. Herein, we report the ruthenium oxide (RuO₂)/tungsten oxide (WO₃) composite nanofibers based photoanode for the application of high performance and durable BPV. The sequential arrangement of 6 nm sized RuO₂/WO₃ spherical particles constitutes the nanofibrous morphology and a number of surface active sites and structural integrity of nanofibers demonstrate the excellent and stable photo-oxidation currents. Under the light regime, RuO₂/WO₃/carbon cloth photoanode exhibits the substantial BPV power and current densities with an excellent durability. Thus this systematic study evokes the fundamental understanding on the electron generation and transference mechanisms, which offers new dimensions in the development of high performance and durable BPVs.

**KEYWORDS**

biophotovoltaic cell, green energy, microalgae, nanofiber, photocatalysis

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**1 | INTRODUCTION**

The inevitable depletion of fossil fuels and its combustion lead to deleterious effects on environment and global energy demand, which necessitates the prospective development of an efficient and sustainable green...