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# Ni-doped TiO<sub>2</sub> nanotubes photoanode for enhanced photoelectrochemical water splitting

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## ABSTRACT

Photoelectrochemical (PEC) water splitting hydrogen production provides a promising way for sustainable development. In this work, we prepared Ni-doped TiO<sub>2</sub> (Ti-Ni-O) nanotubes through anodizing different Ti-Ni alloys and further annealing them at elevated temperatures, and reported their PEC water splitting performance. It was found that Ni doping could improve light absorption and facilitate separation of photo-excited electron-hole pair. The nanotubes fabricated on Ti-1 wt.% Ni alloy and annealed at 550 °C exhibited better PEC water splitting performance than those on Ti-10 wt.% Ni alloy. The photoconversion efficiency was 0.67%, which was 3.35 times the photoconversion efficiency of undoped TiO<sub>2</sub>. It demonstrated that it was feasible to fabricate high-performance Ti-Ni-O nanotubes on Ti-Ni alloys and used as photoanode for improving PEC water splitting.

**Keywords:** Ti-Ni alloys; Anodization; Ni-doped TiO<sub>2</sub> nanotubes; Photoelectrochemical; Water splitting

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