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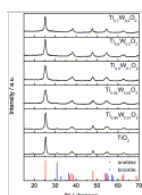
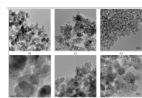
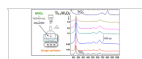
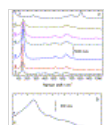
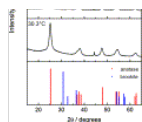


Table 1



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Mixed-oxide Ti_{1-x}W_xO₂ as support for (photo)-electrochemical processes

S. Mokrane-Soualah^{a, b}, A.S. Gago^{a, 1}, A. Habrioux^a, N. Alonso-Vante^a

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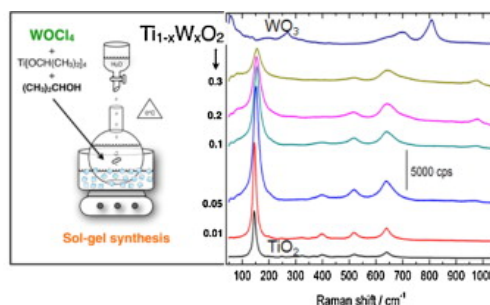
- Nanostructured mixed-oxide Ti_{1-x}W_xO₂ (0 < x < 0.3) was synthesized by sol–gel.
- W (x ≤ 0.5) is incorporated into the anatase phase with an expansion of the lattice.
- With W content (0.5 < x < 0.3) compressive strains appeared with formation of wolframyl groups.
- The incorporation of W (x < 0.3) led to a decrease of the photoresponse and an increase of the conductivity.
- The nanostructured oxides are ceramic substrates for Pt or Ir-based electrodes of PEM fuel cells and electrolyzers.

Abstract

In this study, mixed-oxides of Ti_{1-x}W_xO₂ (0 ≤ x ≤ 0.3) nanomaterials have been synthesized via a multistep sol–gel process. The effect of W doping on the anatase structure and on the electrical conductivity of the material was investigated. Photo-electrochemical action spectra and UV–vis spectroscopy were used to determine the band-gap energy of the mixed-oxides. The electrochemical stability of these materials was also investigated before they were tested as substrate for platinum nanocatalysts for oxygen reduction reaction. The metal was deposited onto the support either via the chemical route (carbonyl method) or via UV-irradiation.

Graphical abstract

A series of mixed-oxide of TiO₂ has been prepared via a multistep sol–gel chemical process. The effect of W doping on the anatase structure and on the electrical conductivity of the material was investigated.



Keywords

TiO₂; Sol-gel; Photoelectrochemistry; ORR; Substrate

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