



Contents lists available at ScienceDirect

## Chemical Engineering Journal

journal homepage: [www.elsevier.com/locate/cej](http://www.elsevier.com/locate/cej)

# Highly robust and efficient Ti-based Sb-SnO<sub>2</sub> anode with a mixed carbon and nitrogen interlayer for electrochemical 1,4-dioxane removal from water

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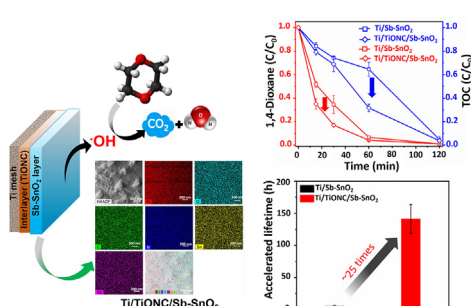
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## HIGHLIGHTS

- A novel Ti-based Sb-SnO<sub>2</sub> anode was fabricated via the insertion of TiONC interlayers.
- The interlayer enhanced the crystallinity, current density, and oxygen evolution potential.
- Complete 1,4-dioxane mineralization was achieved at a rate constant of  $1.91 \times 10^{-2} \text{ min}^{-1}$ .
- The accelerated life of Ti/TiONC/Sb-SnO<sub>2</sub> was ~25 times longer than that of Ti/Sb-SnO<sub>2</sub>.
- Enhanced durability resulted from blocking oxidants and corrosive ions using the interlayer.

## GRAPHICAL ABSTRACT



## ARTICLE INFO

## Keywords:

Sb-SnO<sub>2</sub>

Electrode stability

Interlayer

Service life

1,4-Dioxane

## ABSTRACT

Ti-based Sb-SnO<sub>2</sub> electrodes are attractive due to their excellent catalytic activity but have a short service life. Here, we report a highly stable and efficient Ti/TiONC/Sb-SnO<sub>2</sub> electrode, which was fabricated through hydrothermal reactions using urea to form TiONC interlayers and electrodeposition-annealing to coat the active Sb-SnO<sub>2</sub> catalysts. The triple-layered anode was characterized by highly crystalline structures, high oxygen evolution potentials, and corrosion-resistance properties. The structural arrangement yielded better electrocatalytic performances than that using the control electrode (Ti/Sb-SnO<sub>2</sub>), showing enhanced organics degradation efficiencies. This new electrode's lifetime was significantly (~25 times) longer than that of either the control or any Sb-SnO<sub>2</sub> electrode modified with non-precious materials reported in the literature. The electrode's enhanced stability was attributed to the insertion of the mixed C and N interlayers that are resistant to oxidants and corrosive ions. The Ti/TiONC/Sb-SnO<sub>2</sub> anode holds promise for use in electrochemical water treatment.

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