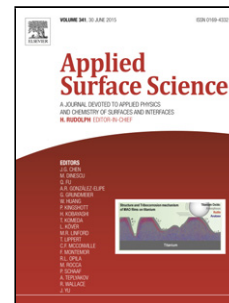


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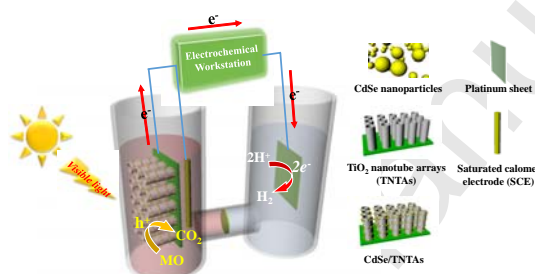
# Photoelectrocatalytic hydrogen generation and simultaneous degradation of organic pollutant *via* CdSe/TiO<sub>2</sub> nanotube arrays

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## Graphical Abstract



A highly efficient CdSe/TiO<sub>2</sub> nanotube arrays photoanode was explored *via* the electrodeposition with ion-exchange method for photoelectrocatalytic hydrogen evolution and simultaneous degradation of organic pollutant under visible light irradiation.

## Highlights:

1. CdSe nanoparticles enhanced TiO<sub>2</sub> nanotube arrays electrode was prepared by an electrodeposition with ion-exchange method.
2. CdSe nanoparticles were strongly bonded on the pore walls of TiO<sub>2</sub> nanotube arrays, with the formation of CdSe-TiO<sub>2</sub> heterojunctions.
3. Such CdSe/TiO<sub>2</sub> nanotubes arrays, acting as photoanode, exhibited high efficiency for both generation of hydrogen and degradation of MO in photoelectrocatalysis reaction system under visible-light irradiation.

## ABSTRACT:

CdSe nanoparticles enhanced TiO<sub>2</sub> nanotube arrays electrodes (CdSe/TNTAs) were explored as the photoanode for driving the photoelectrocatalytic (PEC) generation of hydrogen and simultaneous degradation of organic pollutants in a PEC system. The evolution hydrogen and the simultaneous degradation of organic pollutants were performed in an electrolytic cell (three electrodes system) under visible-light ( $\lambda > 400$  nm). Such CdSe/TiO<sub>2</sub> based PEC system exhibited both high efficiency of hydrogen

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