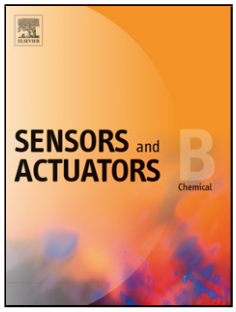

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Facet-specific Heterojunction in Gold-decorated Pyramidal Silicon for Electrochemical Hydrogen Peroxide Sensing

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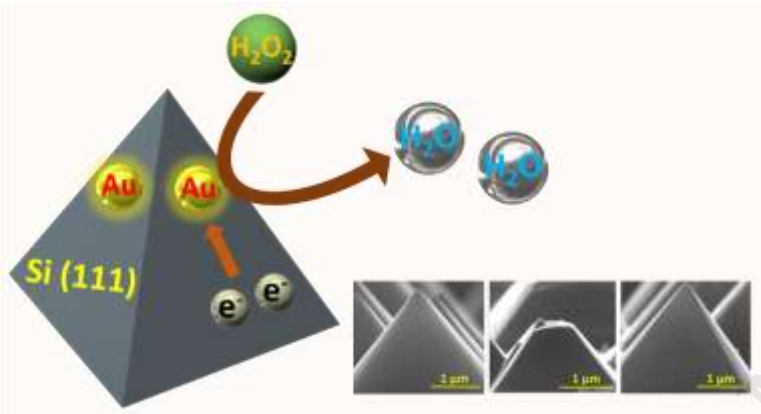
Graphical Abstract



Highlight:

Large scale Si pyramidal electrodes with monolithic exposure of Si (111) can be prepared by selective alkaline etching.

The success fabrication of Au/Si (111) heterojunction exhibits the facet-dependent electrochemical activities superior to Au/Si (100), and synergistically enhances the electrochemical sensing performance.

The H_2O_2 sensing performance of Au/Si (111) achieves 194 times greater sensitivity than the Au/Si (100) with a wide linear range (0.01 to 55.55 mM), high sensitivity (171 μA mM^{-1} cm^{-2}), and low detection limit of 1.24 μM.

A B S T R A C T

Nanoscale heterojunction of asymmetrical band structures and electron distributions at the