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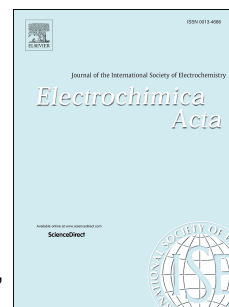
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# Reverse type I core - CuI /shell - CuO: a versatile heterostructure for photoelectrochemical applications

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**KEYWORDS.** Core-shell semiconducting structure, photocathode, photoanode, copper oxide

**ABSTRACT.** Here we report the synthesis of a core - CuI / shell - CuO nanostructure that depending on the applied potential works as photocathode or photoanode in neutral pH upon visible light irradiation. Under cathodic polarization, this material generates a stable photocurrent density of about  $150 \mu\text{A}/\text{cm}^2$  but functions as photoanode when anodic polarization is applied showing a photocurrent density of  $40 \mu\text{A}/\text{cm}^2$ . In this new core-shell structure, the relevant position of the band edge potentials is pH-tunable and does not strictly follow the typical Nernstian dependence as by many semiconductor oxides, opening new directions in the nanoscale design of stable photoelectrodes for solar water splitting.

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