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

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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 μA/cm^2~~ but functions as photoanode when anodic polarization is applied ~~showing a photocurrent density of 40 μA/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.