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Electric field directed growth of cuprous oxide nanostructures for photon sensing SANGEETA SAHOO, SAROJ NAYAK, Rensselaer Polytechnic Institute, PULICKEL AJAYAN, Rice University — We demonstrate an electrodeposition technique to synthesize cuprous oxide nanomaterials in various types of nanostructural form at room temperature. We apply an electric field under deionized water between two electrodes one of which is made of Cu. Using this method, direct growth of nanostructures has been achieved on different types of substrates. We show that the structural evolution depends strongly on the electric potential between the electrodes and also on the type of substrates. We have studied the growth mechanism on flat Si substrate and on Transmission electron Microscopy grid. A variety of structures from simple one dimensional nanowires to different complex two and three dimensional structures are successfully grown directly on substrates with this method. Direct integration of these nanostructures on Si substrate brings us one step ahead towards the fabrication of electronic devices. Taken together, this novel technique of Cu_2O nanostructure production is highly reproducible, catalysts free, fast and a low cost simple process. In addition, the electrical characteristics indicate the usefulness of these structures for photo-sensing and optoelectronic applications.

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