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Study of CuO nanostructures modified with a sequential thermal treatment for photovoltaic applications

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Copper (II) oxide (CuO) is a sustainable, stable, non-toxic photovoltaic material that can be produced using low-cost techniques. The primary objective of this research is to develop a heterostructure based on elongated CuO nanostructures with an inverted and branched architecture. In this heterostructure, the CuO layer serves as both, the support and the absorbing material for solar radiation. This study presents results from CuO nanostructured samples subjected to a sequential thermal treatment. This approach was chosen because it can enhance the structural, electrical and optical properties more effectively than standard thermal treatments by optimizing each step of the thermal cycle. The samples were characterized using scanning electron microscopy (SEM), X-ray diffraction (XRD) and Rutherford backscattering spectrometry (RBS). We investigate the structural changes and defect formation in the nanostructured CuO layer resulting from the sequential thermal treatment. The findings indicate a recrystallization process in the CuO layer leading to the improvement of material properties.

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