

GROWTH AND PROPERTIES OF ZINC OXIDE FILMS PREPARED BY CHEMICAL VAPOUR
DEPOSITION AND THEIR APPLICATIONS IN SOLAR ENERGY UTILIZATION.

BY

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Thesis submitted in partial fulfillment for the degree of Master of
Science of the University of Nairobi.



OCTOBER 1993 TO
THIS THESIS HAS BEEN ACCEPTED FOR
THE DEGREE OF *MSC 1994*
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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.



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ABSTRACT

Transparent and conducting thin ZnO films have been prepared by chemical vapour deposition method. The growth parameters have been optimized and optical and electrical properties of the films studied. The effects of doping and annealing on the properties of as-grown films have been investigated. The direct and indirect bandgap values of these films were found to be 3.28eV and 3.07eV respectively. Films with carrier concentration of the order 10^{21} cm^{-3} , sheet resistance of $250\Omega / \square$ and a transmission of 80% in the visible region of the spectrum were prepared.

ZnO / SiO₂ / p-Si solar cells were fabricated which yielded a short circuit current density of $6.2\text{mA}/\text{cm}^2$, a fill factor of 0.25, an open circuit voltage of 202mV and an efficiency of 0.4%. A large interfacial layer and high series resistance could be the main factors that contributed to the low efficiency of these cells.