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EDUCATION

Ph.D. Chemistry, University of Otago, Dunedin, New Zealand, 1997
B.Sc. (Hons., 1st Class), Chemistry, University of Otago, 1993

EXPERIENCE

2001-Present Research Associate III
Institute of Energy Conversion, University of Delaware, Newark, Delaware
As Research Associate III, research involves investigating various aspects of CdTe/CdS solar cells. This includes (a) studying effects of back contact processing on cell behavior (including attempting to control back contact behavior and stability by addition of chemical agents to the back contact), and (b) the identification of cell degradation mechanisms, with particular emphasis on isolating the possible involvement of Cu (which is often used to produce good-quality back contacts) in these processes. Also investigating suitability of electrodeposition for processing of CuInSe₂ and Cu(In,Ga)Se₂ thin-films for solar cell application. Of particular interest is the electrodeposition of thin-films from a single aqueous bath in order to simplify device processing. Understanding and controlling the chemistry of the bath and film growth and the optimization of post-deposition processing are critical to obtaining successful device quality films.

1999-2001 Post-doctoral Fellow
Department of Materials and Interfaces,
Weizmann Institute of Science, Rehovot, Israel
Project involved the investigation of the role of Cu in the degradation of CdTe/CdS solar cells. Techniques used to investigate cells included light- and electron-beam induced current (LBIC, EBIC), current-voltage measurements (IV), secondary ion mass spectrometry (SIMS), photoluminescence (PL), and X-ray photoelectron spectroscopy (XPS). Cu was found to have diffused throughout the cell structure following back contact processing, and significant Cu-doping was found to make the

CdS layer photoconducting. Effects of atmospheric components during stress testing were also monitored, and results suggested cell encapsulation to be critical to enhance cell/module lifetimes. A second aspect of this project involved the preparation, based on electroless deposition methods, of a new NiTe₂ (Cu-free) back contact to CdTe/CdS cells.

1997-1998

Research Fellow
Department of Chemistry,
University of Otago, Dunedin, New Zealand
Project title: "In Situ FTIR Spectroscopic Investigations of the Surface Reaction of Sulfide at Activated and Natural Carbons."

PATENTS

1. "Improvements In or Relating to Spectroscopic Surface Analysis"
Inventors: A.J. McQuillan, P.A. Connor and K.D. Dobson
Provisional Patent filed 24 June 1996, New Zealand

AWARDS

- * Postdoctoral Fellowship, Feinberg Graduate School of the Weizmann Institute of Science, Rehovot, Israel, 1999
- * Postgraduate Scholarship, University of Otago, Dunedin, New Zealand, 1994
- * Joseph and Emma Mellor Prize in Chemistry, University of Otago, 1993