

Abstract Number: M5.23**Day / Time:** Wednesday, Apr. 15, 8:00 PM - 11:00 PM

X - ray Absorption Studies on Cadmium Selenide Thin Films.

S.Erat^{1,2}; A.Braun¹; H.Metin³; I.Demchenko^{4,5}; W.Stolte^{4,6}; T.Graule^{1,7}. 1. Empa, - Swiss Federal Laboratories for Materials Testing & Research, Dübendorf, Switzerland; 2. Department for Nonmetallic Inorganic Materials, ETH Zurich, Zurich, Switzerland; 3. Department of Physics, Mersin University, Mersin, Turkey; 4. Department of Chemistry, University of Nevada, Nevada, CA; 5. Institute of Physics, Polish Academy of Sciences, Warsaw, Poland; 6. Lawrence Berkeley National Laboratory, Berkeley, CA; 7. Technische Universität Freiberg, Freiberg, Germany.

CdSe is a prospective candidate for solar cells. High temperature annealing is typically a mandatory step for the processing of the films, but the annealing temperature can have a negative effect on the performance if it is too low or too high. We present here an annealing study of CdSe films with different annealing temperature. Our films were synthesized by chemical bath deposition on glass substrates at 337 K, followed by subsequent annealing in nitrogen atmosphere from 337 K to 773 K. The films show different spectral and conductivity characteristic depending on the annealing temperature. These films were subjected to x-ray absorption spectroscopy at the Cd L2 and L3 edges (3400 eV - 3600 eV) at beamline 9.3.1 at the Advanced Light Source in Berkeley, California. Since the films present a concentrated system with a high potential for self-absorption, we recorded the spectra in the total electron yield mode. Close inspection of the Cd L3 region of the spectra suggests a small chemical shift towards lower energies with increasing annealing temperature, suggesting a chemical reduction of the cadmium. Precise quantitative analysis of the pre-edge region shows actually a chemical shift of totally ~ 0.5 eV or slightly more in the annealing range from 337 K to 773 K, confirming that the cadmium is slightly reduced with increasing annealing temperature. Interestingly, the spectra of the films annealed at 100 °C and 200 °C having optical band gap at around 1.8 eV are completely different from those of the others. These two films don't have any peak splitting although others have strong peak splitting at around 3565 eV. The pre-peak growing at around 3547 eV become dominant in the spectra of the films annealed at 400 °C and 500 °C.

Citation: S.Erat, A.Braun, H.Metin, I.Demchenko, W.Stolte, T.Graule. X - ray Absorption Studies on Cadmium Selenide Thin Films.. Abstract No. M5.23. *2009 Abstract Viewer*. San Francisco, CA: Materials Research Society

Application Design and Programming Copyright ScholarOne, Inc. All Rights Reserved. Patent Pending.