SOLAR QUEST

SEMINAR ANNOUNCEMENT

Dr. Kin Man Yu

Materials Sciences Division
Lawrence Berkeley National Laboratory, USA

DESIGN, SYNTHESIS AND CHARACTERIZATION OF NEW MATERIALS FOR SOLAR ENERGY CONVERSION

DATE: Wednesday, January 22, 2014
TIME: 14:00-16:00
PLACE: Seminar Room A-502
CCR Building, 5F

ABSTRACT

Recent progress in the understanding of properties of complex semiconductor materials has opened up new possibilities for designing semiconductor materials with the electronic band structure optimized for specific device applications. In this talk, I will give an overview on our recent research on novel semiconductors for solar power conversion devices, including group nitrides, highly mismatched alloys and ideal transparent conductors. In particular, I will focus on our development of highly mismatched alloys (HMAs), a new class of semiconductors whose electronic band structure can be tailored for specific applications by alloying the anion of a common semiconductor with isovalent elements of very different electronegativity/size. Using non-equilibrium synthesis methods, we have successfully synthesized various dilute III-V and II-VI based HMAs and established that electronic structures of these HMAs are well described by the Band Anticrossing (BAC) model. Recently, this research has been extended to HMAs over the entire composition range (e.g. $GaN_{1-x}As_x$) as well as group II oxide based HMAs (e.g. $ZnO_{1-x}Se_x$ and $ZnO_{1-x}Te_x$). The potential applications of these materials for solar energy conversion devices, including high efficiency solar cells and photo-electrochemical water splitting will be discussed.

Solar Quest Host: Prof. Yoshitaka Okada, ext. 56501
Refreshments will be served.

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