
Fostering Successful International Student Research

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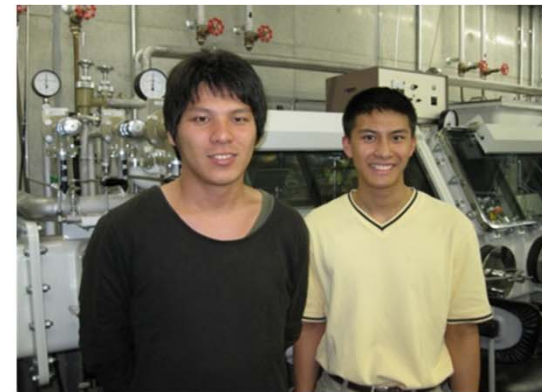
What are the merits and impacts of international student research?

- Significant cultural awareness and global perspectives....

Katherine with Haesuk at Kumoh

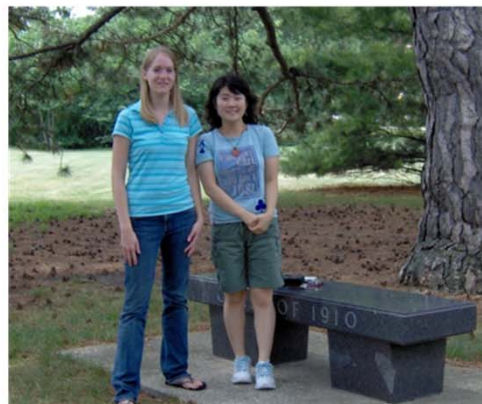


Minami with Seth at Osaka

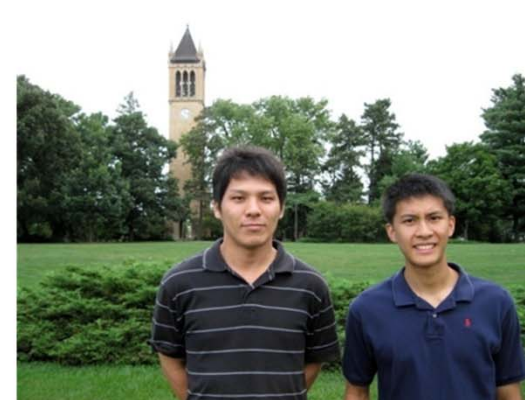


- Intl REU students
Katherine Lawler and Seth Berbano share reciprocal mentoring with students from Korea and Japan

Katherine with Haesuk at ISU



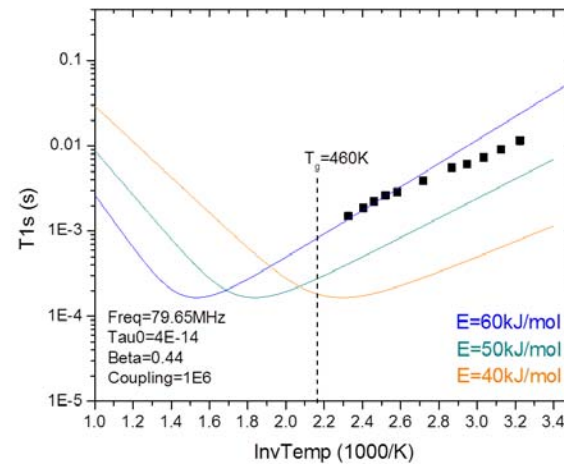
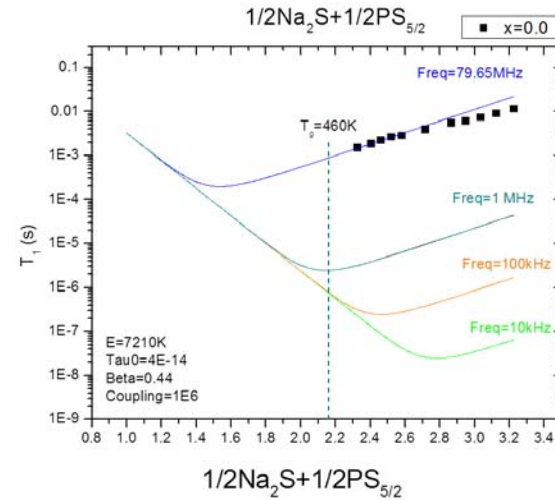
Minami with Seth at ISU



What are the merits and impacts of international student research?

- Significant new research and scientific discovery...

- Intl REU Max Marple, ISU, bottom right, conducts nuclear spin lattice relaxation time measurements with Professor Roland Bohmer, TU Dortmund to examine new Na⁺ ion solid electrolytes for Na batteries

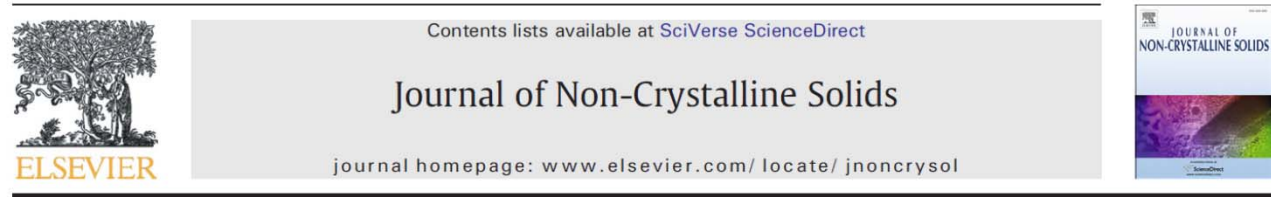


What are the merits and impacts of international student research?

■ Significant new scientific research products...

- Intl. REU Seth Berbano is the first author on a paper resulting from a collaboration with the Osaka, Japan glass solid electrolyte research group

Journal of Non-Crystalline Solids 358 (2012) 93–98



Formation and structure of $\text{Na}_2\text{S} + \text{P}_2\text{S}_5$ amorphous materials prepared by melt-quenching and mechanical milling

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Mechanical milling;
Raman spectroscopy;
Infrared spectroscopy

ABSTRACT

$x\text{Na}_2\text{S} + (1-x)\text{P}_2\text{S}_5$ amorphous and partially crystalline materials were prepared by melt-quenching and mechanical milling. These products were characterized using x-ray diffraction (XRD), Fourier-transform infrared spectroscopy (FT-IR), and Raman spectroscopy. Compared to the narrower x-ray amorphous range for this system obtained through melt-quenching as found in this study, $0.50 \leq x \leq 0.67$, the x-ray amorphous range for this system could be extended from the low-alkali ultra-thiophosphate composition of $x = 0.25$ to slightly above the high-alkali pyro-thiophosphate composition of $x = 0.70$ using mechanical milling. Mechanically milled samples with Na_2S of composition $x = 0.75$ yielded a partially crystalline material that had diffuse XRD peaks associated to the $\alpha\text{-Na}_3\text{PS}_4$ phase. A similar result was obtained for the $x = 0.80$ composition except that, as expected, it also showed peaks for unreacted (over stoichiometric) Na_2S . The melt-quenched and mechanically milled samples with the same compositions $0.50 \leq x \leq 0.67$ showed similar FT-IR and Raman spectra, indicating very similar chemical short-range structures are present in both of these amorphous materials. It was found that the $\text{Na}_2\text{S} + \text{P}_2\text{S}_5$ system exhibited similar behavior to that of the $\text{Li}_2\text{S} + \text{P}_2\text{S}_5$ in that chemical reaction between Na_2S and P_2S_5 could be induced by mechanical milling near room temperature to produce both amorphous and polycrystalline materials.

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Glass IMI @ Lehigh and Penn State



International REU's

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Universidad Autonoma
de Madrid



Samuel Young
Iowa State
University 2008

Japan
Osaka Prefecture
University



Seth Berbano
Iowa State
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South Korea
Gyeongsang
National University



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Research Experiences for Undergraduates (REU) in Glass

Applications for 2013 Program is now closed



Two REU Participants taking a break from making glass at Lehigh University

The purpose of the REU in Glass summer program is to introduce US undergraduate students to the opportunities in glass research through active involvement at a world class glass research facility, either in the US or abroad.

ELIGIBILITY

Funding for this program comes from the National Science Foundation, which has set the following requirements:

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Education and Outreach

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Other Helpful Links:

- [Glass Education for Students, Teachers & Public](#)

Fostering Successful International Student Research

- Let's have a discussion....
- Some suggestions for questions that we might discuss
 - How do we enable international experiences that create strong cultural and global experiences, yet also create strong research experiences?
 - How do we identify international collaborations that are appropriate to the particular student and her/his research project at her/his home institution?
 - How can the short term international research experiences be used to foster longer term sustainable and mutually beneficial research collaborations?
 - How do we help our students address language, cultural, and socio-political differences so that they can succeed in their new research environments?
 - What are the best mechanisms to support the additional costs of these international research experiences?
 - How can we leverage US support to deepen engagement by international students/researchers coming to the US?
 - Are there on-line/off-line resources that faculty mentors and students can use to facilitate more successful international research experiences?
 - How do we promote international research experiences to students as a fun, profitable, and important professional experience?
 - Other questions....?