Regulated Research Institutional/Industrial Setting Form (1C)

This form must be completed AFTER experimentation by the adult supervising the student research conducted in a regulated research institution, industrial setting or any work site other than home, school or field.

Student's Name(s) Ethan Eisenberg and Jack Cox

Title of Project Stability Enhancement of Perovskite Solar Cells Using Mixed C

To be completed by the Supervising Adult in the Setting (NOT the Student(s)) after experimentation:
(Responses must be on the form as it is required to be displayed at student's project booth; please do not print double-sided.)

The student(s) conducted research at my work site:

1. Did you or your proxy (e.g. graduate student, postdoc, employee) mentor or provide substantial guidance to the student researcher? ☑ Yes ☐ No
   a. If no, describe your and/or your institution's role with the student researcher and his/her project (e.g. supervised use of equipment on site without ongoing mentorship and sign below.

   b. If yes, complete questions 2–5.

2. Is the student's research project a subset of your ongoing research or work? ☑ Yes ☐ No
   Use questions 3, 4 and 5 to detail how the student's project was similar and/or different from ongoing research or work at your site.

3. Describe the independence and creativity with which the student:
   a. developed the hypotheses or engineering goals for the research project

   My group studies the influence of polymers in stabilizing Perovskite solar cells. These students chose to experiment with mixed Pervoskite structures and determine their influence on efficiency and stability of the resulting cells. The students showed creativity in the combination of materials used in creating the Pervoskite films and in the analysis of the effect.

   b. designed the methodology for his/her research project

   The students designed the methodology for analysis of the films. They measured changes in grain size, performed XRD to determine crystallinity, and experimented with hot casting techniques.

   c. analyzed and interpreted data

   Students analyzed the data on their own time. They used imaging software as well as examined literature to compare the results to the control. Students also discussed with mentors to verify they have accurately interpreted the data.

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4. Detail the student's role in conducting the research (e.g. data collection, specific procedures performed). Differentiate what the student observed and what the student actually did.

Students contributed to the engineering of the solar cell with a spin-coating technique of the Titanium dioxide thin film layer, or the electron transport layer of the photovoltaic. Students also prepared FTO wafers and glass wafers for solar cell fabrication and measurements. Furthermore, they were also helpful in developing the Titanium dioxide precursor solution. .Mentors, however performed tests such as the efficiency, stability, UV-Visible Spectroscopy , surface morphology, and X-ray diffraction.

5. Did the student(s) work on the project as part of a group? ☑ Yes ☑ No
If yes, how many individuals were in the group and who were they (e.g. high school students, graduate students, faculty, professional researchers)?

The students did not work as part of a group with other high school students. The students worked directly with a graduate student who supervised them in the lab and provided guidance.

I attest that the student has conducted the work as indicated above and that any required review and approval by institutional regulatory board (IRB/IACUC/IBC) has been obtained. Copies are attached if applicable.
I further acknowledge that the student will be presenting this work publicly in competition and I have communicated with the student research regarding any requirements for my review and/or restrictions of what is publicized.

Miriam Rafailovich	Miriam Rafailovich Digitally signed by Miriam Rafailovich Date: 2019.11.19 00:10:17 -05'00'	Dist. Prof.
Supervising Adult's Printed Name	Signature	Title
Stony Brook University		11/19/2019
Institution		Date Signed (must be after experimentation) (mm/dd/yy)
100 NIchols Road		5164589011
Address		Email/Phone