



**"Materials, The Building Block For The Future"**

# 3<sup>rd</sup> AAAFM-UCLA International Conference

August 18-20, 2021

Ackerman Grand Ballroom, UCLA

**Dated:** March 15, 2021

## *Acceptance Letter*

Dear Olikh, Oleg (1);  
Kostylyov, Vitaliy (2);  
Vlasiuk, Victor (2);  
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## *Abstract Approval ID: 817*

Your abstract, "**Ultrasound as Functional Influence Tool on FeB pair Association in Silicon Solar Cells**" submitted under **Symposium 1: Functional Materials for Energy Storage and Conversion Devices (FESC)**, submitted on: 2021-Mar-09 06:18, presentation type: **Poster** has been accepted for presentation at the "International Conference on Advances in Functional Materials which will be held at UCLA (AAAFM-UCLA)".

**For Oral Presenters:** A projector and screen will be available in each meeting room, and in most rooms, a lapel microphone and podium will be provided. All technical session, presentation's scheduled time and location will be announced soon.

**For Poster Presenters:** Posters **must** be of **A1 size (in portrait)**. Authors should print the poster and bring it with them to the conference. The schedule for the poster presentation will be published soon on our website.

The registration is now open. Delegates can register for the conference on/before 25<sup>th</sup> March, 2021 to avail **Early Bird**, discounted rates. Make sure that you use your Abstract Approval ID (provided above) while making registration. Please visit <https://aaafm.org/ucla2021/registration> to complete your registration now.

**Students** are required to upload valid proofs online during registration to obtain discount rates.

Organizing Committee  
Advances in Functional Materials Conference  
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# AAAFM Materials For Life

American Association for Advances in Functional Materials



**Abstract ID: 817**

**Symposium 1: Functional Materials for Energy Storage and Conversion Devices (FESC)**

**Poster/Oral Presentation**

*Topics:* Solar Cells

*Keywords:* Ultrasound, Silicon, Solar Cell, FeB pair

**Ultrasound as Functional Influence Tool on FeB pair Association in Silicon Solar Cells**

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Defects are crucial for solar cell (SC) performance. The irradiation and annealing are the widespread techniques of functional defect engineering. But another selective as well as room temperature realized way of defects modification is the ultrasound excitation in a crystal. The acoustic waves are able to cause redistribution of impurities, point defects rebuilding and affect SC properties as well [1]. In this work, the influence of ultrasound loading (USL) on a FeB pair association in silicon SC was under consideration. The iron is a major contaminant as well as one of the most detrimental impurities in silicon photovoltaic devices and the investigation is important from an applied point of view.

The Si-SC was fabricated from p-type boron doped wafer with <100> orientation and a doping level of  $1.4 \cdot 10^{15} \text{ cm}^{-3}$ . In USL case the longitudinal waves with 4.1 MHz frequency and up to  $\sim 0.5 \text{ W/cm}^2$  intensity were excited. The FeB pair dissociation was made by halogen lamp illumination ( $0.25 \text{ W/cm}^2$ , 15 s). The short circuit current value (LED, 940 nm,  $0.15 \text{ mW/cm}^2$ ) was used to characterize recombination process in the SC base. The  $I_{sc}$  kinetic was fitted by taking into account intrinsic recombination and to Shockley-Read-Hall recombination on interstitial iron and FeB pair and the iron atom migration energy  $E_m$  was determined. The acousto-induced reduction in  $E_m$  value has been revealed. The  $E_m$  decrease runs up to 10 meV and non-linear depends on US intensity. Thus the ultrasound can be effective tool of defect engineering in solar cell functional materials. The work was supported by NRFU (project 2020.02/0036).

**References**

1. O. Ya. Olikh, A. M. Gorb, R. G. Chupryna, J. Appl. Phys., 123 (2018) 161573.