BlueNova: Innovative Approaches for optimizing and stabilizing Perovskite-based Blue LEDs

A Data Management Plan created using DMPonline.be

Creator: Harshita Bhatia

Affiliation: KU Leuven (KUL)

Template: KU Leuven BOF-IOF

Grant number / URL: PDMT2/23/040

ID: 204473

Start date: 09-11-2023

End date: 30-09-2024

Project abstract:

BlueNova is an innovative project aiming to advance LED lighting technology by utilizing perovskite materials as emissive layers. Addressing the prevalent issues of high production costs, limited luminous efficiency, and a narrow color spectrum in conventional LED lighting, the project focuses on exploiting the notable efficiency, brightness, and extensive color gamut offered by perovskite-based LEDs. Central to the project is the development of stable, blue-emitting perovskite nanoplatelets through state-of-the-art synthesis and post-synthesis techniques, alongside defect passivation strategies to improve stability. A significant innovation of BlueNova is the synthesis of water-compatible perovskites, overcoming the challenge of moisture sensitivity in perovskites. This advancement enables direct exfoliation of quasi-2D materials using water, enhancing optoelectronic properties. The synthesis methodology includes compositional engineering, followed by advanced characterization techniques, and collaboration with experts in LED device fabrication. The proposed research aims to significantly advance the field of blue-emitting NCs, paving the way for practical applications in lighting and display technologies.

Last modified: 03-02-2024

BlueNova: Innovative Approaches for optimizing and stabilizing Perovskite-based Blue LEDs

Research Data Summary

List and describe all datasets or research materials that you plan to generate/collect or reuse during your research project. For each dataset or data type (observational, experimental etc.), provide a short name & description (sufficient for yourself to know what data it is about), indicate whether the data are newly generated/collected or reused, digital or physical, also indicate the type of the data (the kind of content), its technical format (file extension), and an estimate of the upper limit of the volume of the data.

Dataset name / ID	Description	New or reuse	Digital or Physical data	Data Type	File format	Data volume	Physical volume
		Indicate: ***N****(ew data) or* ***E****(xisting data)*	Indicate: **D**(igital) or **P**(hysical)	Indicate: **A**udiovisual **I**mages **S**ound **N**umerical **T**extual **M**odel **SO**ftware Other (specify)		Indicate: <1GB <100GB <1TB <5TB >5TB NA	
Synthesis	Perovskite nanocrystals, such as formamidinium lead bromide	N	P				0.50 ml suspension in a 4 ml vial
Experimental data	Optical and structural characterization	N	D	I T	.xls .txt .jpeg	<100 GB	
Device data	LED proof-of-concept and more prototype devices	N	D	N	.xls .txt	<100 GB	
Images	Digital images of thin films taken under ambient conditions and LED devices under operation	N	D	I	.jpeg	<100 GB	

If you reuse existing data, please specify the source, preferably by using a persistent identifier (e.g. DOI, Handle, URL etc.) per dataset or data type:

NA

Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? If so, refer to specific datasets or data types when appropriate and provide the relevant ethical approval number.

- No

Will you process personal data? If so, please refer to specific datasets or data types when appropriate and provide the KU Leuven or UZ Leuven privacy register number (G or S number).

- No

Does your work have potential for commercial valorization (e.g. tech transfer, for example spin-offs, commercial exploitation, …)? If so, please comment per dataset or data type where appropriate.

- Yes

The advancements made in this research project hold strong potential for commercialization, offering opportunities for tech transfer, spin-offs, and commercial exploitation in the solid-state lighting and display sectors. The perovskite nanocrystals synthesized in this project are particularly relevant for applications in these sectors.

Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material or Data transfer agreements, Research collaboration agreements)? If so, please explain in the comment section to what data they relate and what restrictions are in place.

- No

Are there any other legal issues, such as intellectual property rights and ownership, to be managed related to the data you (re)use? If so, please explain in the comment section to what data they relate and which restrictions will be asserted.

- No

Documentation and Metadata

Clearly describe what approach will be followed to capture the accompanying information necessary to keep data understandable and usable, for yourself and others, now and in the future (e.g. in terms of documentation levels and types required, procedures used, Electronic Lab Notebooks, README.txt files, codebook.tsv etc. where this information is recorded).

Synthesis details and observations will be recorded in a lab notebook. Simultaneously, all experimental data, including materials characterization and LED device results, will be stored on KU Leuven servers. Regular backups will be taken to safeguard data and ensure continued accessibility.

Will a metadata standard be used to make it easier to find and reuse the data?
If so, please specify which metadata standard will be used.

If not, please specify which metadata will be created to make the data easier to find and reuse.

- Yes

KU Leuven Research Data Repository (RDR)

Data Storage & Back-up during the Research Project

Where will the data be stored?

- Shared network drive (J-drive)
- Personal network drive (I-drive)
- OneDrive (KU Leuven)

How will the data be backed up?

- Standard back-up provided by KU Leuven ICTS for my storage solution

Is there currently sufficient storage & backup capacity during the project?

If no or insufficient storage or backup capacities are available, explain how this will be taken care of.

- Yes

How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?

Data on KU Leuven servers is restricted to authorized users. OneDrive folders are shared only with relevant personnel, and J-Drive folders are password-protected.

What are the expected costs for data storage and backup during the research project? How will these costs be covered?

NA

Data Preservation after the end of the Research Project

Which data will be retained for 10 years (or longer, in agreement with other retention policies that are applicable) after the end of the project?

In case some data cannot be preserved, clearly state the reasons for this (e.g. legal or contractual restrictions, storage/budget issues, institutional policies...).

- All data will be preserved for 10 years according to KU Leuven RDM policy

Where will these data be archived (stored and curated for the long-term)?

- Large Volume Storage (longterm for large volumes)
- Shared network drive (J-drive)
- KU Leuven RDR

What are the expected costs for data preservation during the expected retention period? How will these costs be covered?

NA

Data Sharing and Reuse

Will the data (or part of the data) be made available for reuse after/during the project?
Please explain per dataset or data type which data will be made available.

- Yes, as restricted data (upon approval, or institutional access only)

Scientific publication-related data will be accessible upon publication. Additional data can be acquired by researchers upon request and approval from the Principal Investigator, Harshita Bhatia, and Supervisor, Professor Elke Debroye.

If access is restricted, please specify who will be able to access the data and under what conditions.

Access to the data will be restricted to members of our research group, supervised by Prof. Elke Debroye. Researchers can access the data after making a formal request.

Are there any factors that restrict or prevent the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)?

Please explain per dataset or data type where appropriate.

- Yes, intellectual property rights

Where will the data be made available?

If already known, please provide a repository per dataset or data type.

- KU Leuven RDR (Research Data Repository)

When will the data be made available?

- Upon publication of research results

Which data usage licenses are you going to provide?

If none, please explain why.

- Other (specify below)

To be specified later

Do you intend to add a persistent identifier (PID) to your dataset(s), e.g. a DOI or accession number? If already available, please provide it here.

- Yes, a PID will be added upon deposit in a data repository

What are the expected costs for data sharing? How will these costs be covered?

NA

Responsibilities

Who will manage data documentation and metadata during the research project?

Harshita Bhatia

Who will manage data storage and backup during the research project?

Data storage and backup during the research project will be managed by Harshita Bhatia, along with other researchers from the same group who are directly collaborating on this project.

Who will manage data preservation and sharing?

Harshita Bhatia

Who will update and implement this DMP?

Harshita Bhatia