



## Master thesis opponent's review

**Master thesis:** Study of Material Segregation in Mixed Halide Perovskite for Solar Cells  
**Author:** Reema Pradeep Newaskar  
**Thesis supervisor:** doc. Mgr. Jakub Holovský, Ph.D.  
**Thesis opponent:** RNDr. Martin Ledinský, Ph.D.

Rating (1 – 5)  
(1 = best; 5 = worst):

1. Fulfillment of assignment requirements:	<input type="text" value="2"/>
2. Systematic solutions of individual tasks:	<input type="text" value="2"/>
3. Ability to apply knowledge and to use literature:	<input type="text" value="1"/>
4. Thesis formal and language level:	<input type="text" value="3"/>
5. Thesis readability and structuring:	<input type="text" value="3"/>
6. Thesis professional level:	<input type="text" value="3"/>
7. Conclusions and their formulation:	<input type="text" value="2"/>
<b>8. Final mark evaluation (A, B, C, D, E, F):</b>	<input type="text" value="B"/>

**verbal:**  
**Very good**

### Brief summary evaluation of the thesis (compulsory):

Most of the assign requirements of the master thesis were fulfilled. The task „mastering the preparation of n-i-p architecture solar cells“ is in my opinion unrealistic in the given time (restricted by the pandemic situation) and I will not take this nissing part in to count. On the other hand the photoluminescence data are really missing for better characterization of the samples and understanding the results.

The given tasks were solved systematically and with clear logic ideas based on detail and deep study of appropriate literature. Unfortunately, the structure of the thesis itself is not so clear anymore, the structure is not well prepared and there is a lot of repetition. For example, idea of tandem cell is described three times. Moreover once, on the page 31, in a wrong way. Additionally, the figure description, namely in the final sections, are often wrong (figure 35, relaxed/LS...). This makes the text hard to read and even harder to understand. The energy axes are often in some logarithmic like scale, which is not needed at all.

On the other hand, the conclusions made base on the measured data are interesting and relevant to the given topic. Segregation tendencies dependence on I/Br ratio is very good example, the stability up to 0.68 I concentration is important result of the thesis.



Even if the formal part of the thesis is not on high level, the scientific relevance and well-structured discussions and conclusions proves the quality of the candidate for scientific work. Therefore, I evaluate this master thesis work as “very good”.

**Questions:**

1. The photoluminescence results are missing in the thesis, why?
2. The high-quality Swiss samples were stable against the segregation process, but highly IV unstable, what was the composition of these samples? Can you compare it with your own samples?
3. Why is the composition  $\text{FA}_{0.83}\text{Cs}_{0.17}\text{Pb}(\text{I}_{0.68}\text{Br}_{0.32})_3$  better in terms of halide segregation than the  $\text{FA}_{0.83}\text{Cs}_{0.17}\text{Pb}(\text{I}_{0.76}\text{Br}_{0.24})_3$ ?

Date: 8<sup>th</sup> June 2021

Signature:

**Notes:**

- 1) The total thesis evaluation needn't be determined by the partial evaluations average.
- 2) The total evaluation (item 8) should be from the following scale:

excellent	very good	good	satisfactory	sufficient	insufficient
A	B	C	D	E	F