Scope of the Thematic Issue:

Title: Recent Advances of Perovskite Optical electronics

The development made by the researchers in flourishing photovoltaic technologies over the past decade has been preeminent. In the last decade, organic-inorganic perovskites are treated as encouraging photovoltaic materials because of their unique properties of large absorption coefficient, long carrier life time, tunable direct bandgaps, ultralow traps state densities, and solution processability, etc. The uncommon relationships between electronic structure, crystal structure and properties play vital role in the expansion of new functional materials and high-performance devices. At the turn of the century, a good number of research laboratories put their concentration on optical properties, ferroelectric properties, crystal structure, and thermal properties of the perovskites. It was demonstrated that perovskite materials seized merits in 2D conductivity, magnetism, optoelectronics, and ferroelectricity. In comparison with 3D counterparts, 2D perovskites have some advantages, such as low trap density, uniform morphology, and large exciton binding energy which are more constructive for high photoluminescence quantum yield. Based on the high photoluminescence quantum yield of perovskite materials, the fabricated devices open a new insight in the field of photovoltaics. Researchers have strategically evolved the potential efforts in the development of efficient algorithms to deal with encapsulation and surface passivation to macadamize the way towards industrial applications. Among many perovskite applications, luminous perovskite has made its trustworthy importance in manufacturing practical applications such as solar cells, lighting devices, scintillators, water splitting photo-catalyst, light emitting diodes, lasing and electronic devices including transducers, actuators, and capacitors. Although, such materials have direct influence of low temperature process, their remarkable optoelectronic characteristics and flexible structure capability have enabled to fabricate efficient LEDs and amplified lasers.

The breakthrough in perovskite LEDs has been as function of emission wavelength. The EQE in the green promptly outstripped 20% but in the blue emission dwelled in the 3% and below range. Recent reports of blue luminescence quantum yield of 80%.

Highly stable and conductive blue emitting perovskite materials remain a fundamental interest. The organic-inorganic perovskite materials are still facing some addressable challenges included low humidity and thermal stability. The utmost bottleneck challenge is to develop lead free devices with zero emission for environment friendly applications. Hence, as a promising candidate for upcoming optoelectronic devices, perovskite materials must conquer the obstructions on the way to immense industry production. Regardless of challenges, organic-inorganic perovskite materials proposed propitious substitutes in order to develop low cost and high-performance optoelectronic devices. The extreme improvement made in a short time span; the organic-inorganic perovskite optoelectronics are predicted to have glistening future.

Keywords: Perovskite solar cells, Optoelectronics, Lasers, Light emitting diodes, Photovoltaics, Fluorescence, Photodetectors

(Statistical analysis of keywords “Perovskite”, January 2019- till now, the total publications in 2019 are 9,047 and the total number of hours in one year is 8760. It means that there is a publication on perovskite after every 45-50 minutes because its November 21. So it’s quite interesting (Note: this statistical analysis is based on web of science))

Sub-topics:

The sub-topics to be covered within the issue should be provided:

- Stability of Perovskite solar cells
- High efficiency Perovskite solar cells
- Flexible Perovskite solar cells
- Semi-transparent Perovskite solar cells
- Perovskites for field effect transistors
- Perovskites in lasers
- Perovskites for Photo-electrolysis
- Perovskite Random Access Memory
- Perovskite light emitting diodes
Tentative titles of the articles and list of contributors:

1. **Transparent electrodes in perovskite solar cell** Prof. Yang Yang (h-index 150): Carol and Lawrence E. Tannas Jr. Endowed Chair in Engineering, University of California, Los Angeles, USA; yangy@ucla.edu

2. **Stability issues in perovskite solar cells** Prof. Gang Li (h-index 69): Professor Dept. of Electronic and Information Engineering, Hong Kong Polytechnic Univ; gang.wli@polyu.edu.hk

3. **Role of Graphdiyne as a electron transporting layer** Prof. Liang-sheng Liao (h-index 60): Professor Institute of Functional Nano & Soft Materials (FUNSOM), Soochow University, China; zkwang@suda.edu.cn

4. **Perovskite based materials for chemical sensors** Prof. Hongwei Song (h-index 51): Professor College of Electronic Science and Engineering, Jilin University, Changchun, China; songhw@jlu.edu.cn

5. **Recent advances in hole and electron transporting materials in perovskite solar cells** Prof. Zhaokui Wang (h-index 34): Professor Institute of Functional Nano & Soft Materials (FUNSOM), Soochow University, China; lsliao@suda.edu.cn

6. **Perovskites in stretchable electronics** Prof. Marco Mazzeo (h-index 23): Professor Istituto di Nanotecnologia CNR-NANOTEC, Via Monteroni, 73100, Lecce, Italy; marco.mazzeo@unisalento.it

7. **Recent advances in lead free perovskite solar cells** Prof. Yu Duan (h-index 22): Professor State Key Laboratory on Integrated Optoelectronics, College of Electronic Science and Engineering, Jilin University, Changchun, China; duanyu@jlu.edu.cn

8. **Dye-sensitized perovskite solar cells** Prof. Chuanjiang Qin (h-index 32): Assistant Professor, OPERA, Kyushu University, Japan; cjqin@opera.kyushu-u.ac.jp

9. **Thermal stability of perovskites materials** Prof. Xiangdong Meng (h-index 20): Professor Jilin Normal Univ, Minist Educ, Key Lab Funct Mat Phys & Chem, Changchun, Jilin, Peoples R China, xdmeng@jlu.edu.cn

10. **Perovskites Light emitting devices** Prof. Shufen Chen (h-index 21): Professor Key Laboratory for Organic Electronics and Information Displays and Jiangsu Key Laboratory for Biosensors, Institute of Advanced Materials (IAM), Jiangsu National Synergetic Innovation Center for Advanced Materials (SICAM), Nanjing University of Posts and Telecommunications, 9 Wenyuan Road, Nanjing 210023, China; iamsfchen@njupt.edu.cn.

11. **Thin film photo detectors based on Perovskites materials** Prof. Wei Hu (h-index 17): Professor Key Laboratory for Micro-/Nano-Optoelectronic Devices of Ministry of Education, IFS Collaboration Innovation Center, School of Physics and Electronics, Hunan University, Changsha China; huwei@hnu.edu.cn

Schedule:

- Thematic issue submission deadline: 10th May, 2020

Contacts:

**Guest Editor Name:** Yu Duan  
**Affiliation:** Jilin University, China  
**Email:** yuduan@jlu.edu.cn

Any queries should be addressed to cnano@benthamscience.org.