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Research areas : Perovskite solar cells

Title of the research: Enhancement in the Performance of Perovskite Solar Cells by Incorporation of Carbon nanotubes

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Description of current and past research:

Research focus is on synthesis, fabrication and characterization of perovskite solar cells with particular emphasis on the incorporation of carbonaceous materials in perovskite solar cells to improve its performance and stability.

Journal publications:

1. Uthayaraj, S.; Karunarathne, D.; Kumara, G.; Murugathas, T.; Rasalingam, S.; Rajapakse, R.; Ravirajan, P.; Velauthapillai, D. Powder Pressed Cuprous Iodide (CuI) as A Hole Transporting Material for Perovskite Solar Cells. Materials 2019, 12, 2037 (Impact factor - 3.057).

2. Uthayaraj, S.; Murugathas, T.; Yohi, S.; Natarajan, M.; Velauthapillai, D.; Ravirajan, P.; Single walled carbon nanotube incorporated Titanium dioxide and Poly(3-hexylthiophene) as electron and hole transport materials for perovskite solar cells. Materials Letters 276 (2020), 128174 (Impact factor–3.204).

List of conference abstracts:

1. Uthayaraj.S, Shivatharsiny.R, Dhayalan.V, and Ravirajan.P, Air-stable organic-inorganic metal halide perovskite material for solar cells, International Conference on Solar Energy Materials, Solar Cells and Solar Energy Applications (SOLAR ASIA – 2018), Kandy, January 4-6, 2018.

2. S.Uthayaraj, R. Shivatharsiny, P. Selvakumar, G. R. A. Kumara, G. Rajapakse , Dhayalan Velauthappillai, P. Ravirajan, Effect of Hole Transporting Materials on the performance of Perovskite solar cells in air, Proceeding of Advanced Materials for Clean Energy and Health Applications (AMCEHA-2019), Jaffna, P30.

3. S.Tharmalingam, S.Uthayaraj, A.Pirashanthan, S.Rasalingam, Dhayalan Velauthapillai and P.Ravirajan, Optimizing the performance of perovskite solar cells by varying active layer thickness, Proceeding of Advanced Materials for Clean Energy and Health Applications (AMCEHA-2019), Jaffna, P48.

4. S.Pitchaya, M.Natarajan, A.Santhanam, V.Asokan, V.M.Ramakrishnan, P.Palanichamy, B.Rangasamy, S.Sundaram, S.Uthayaraj and Dhayalan Velauthapillai, Bio-based Carbon Hole Transporting Material Obtained from the extract of Invasive Species of Agaya Thamarai Plant (Eichhornia crassipes) for cost-effective Carbon based Perovskite Solar Cells, Proceeding of Advanced Materials for Clean Energy and Health Applications (AMCEHA-2019), Jaffna, P24.

5. A.Pirashanthan, S.Uthayaraj, T.Rajaramanan, T.Thivakarasharma, M.Thanikaichelvan, S.Yohi, M.Senthilnanthan, N.Robetson, V.Dhayalan and P.Ravirajan, Enhancing the performance of hybrid nanocrystalline metal oxides/polymer solar cells using Dye as interface modifier, proceedings of the 4th international research symposium on pure and applied sciences (IRSPRS-2019), 25th October 2019 – Faculty of Science, University of Kelaniya, Sri Lanka.

6. V. Gurunanthanan, T. Rajaramanan, S.Uthayaraj, D.Velauthapillai, P.Ravirajan and M.Senthilnanthanan, A simple solvothermal approach to synthesize Zn-doped TiO2 nanomaterials for dye sensitized solar cells, Proceedings of the International Conference on Applied and Pure Sciences, (ICAPS - 2020) - Faculty of Science, University of Kelaniya, Sri Lanka, P58.

7. R.Risendiralingam, S.Uthayaraj, S.Yohi, M.Thanihaichelvan, D.Velauthapillai and P.Ravirajan, Effect of Nickel doping in P3HT hole transporting material on the performance of perovskite solar cells, Proceedings of the Physics Society (URS-2021), University of Jaffna, Sri Lanka, P23.