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Research areas : Third and fourth generation solar cells: Perovskite/Dye Sensitized/Organic Polymer Solar Cells

Title of the research: Organo-Inorganic Perovskite Solar Cells

Current position : Visiting Researcher, Western Norway University of Applied Sciences

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Description of current and past research:

I am a visiting researcher at the Department of Computer Science, Electrical Engineering and Mathematical Sciences at the Western Norway University of Applied Sciences (HVL), under Prof. Dhayalan Velauthapillai. My doctoral research was on Methylammonium lead halide-based perovskite solar cells. My research focused on developing low-cost photovoltaics. I used low-cost carbon-based organic semiconductors (extracted from an invasive plant species: Eichhornia Crassipes has been used as an efficient hole transport cum electrode in PSCs) and facile green synthesized inorganic materials, which have emerged as a promising alternative to expensive inorganic semiconductors. My research works have been published in Nature-Scientific Reports and RSC- New Journal of Chemistry.

My current and future research focus is threefold:

1. To crux new 2D/3D metal oxide nanostructures as an efficient charge of transporting materials.
2. To adopt and develop efficient deposition approaches and to study their synergistic effects on PSCs' performances.
3. To understand and improve device performance in both efficiency and stability using interfacial/surface passivation layers in metal halide perovskite absorbers.

Journal publications:

1. **Selvakumar, P**, Muthukumarasamy, N, Santhanam, A, Asokan, V, Madurai Ramakrishnan, V, Sundaram, S & Velauthapillai, D **2020**, *Perovskite Solar Cells: A Porous Graphitic Carbon based Hole Transporter/Counter Electrode Material Extracted from an Invasive Plant Species Eichhornia Crassipes.* **Nature - Scientific Reports**, vol.10, no. 1, pp.1-16. (**Impact factor 4.12**)

2. **Selvakumar, P**, Muthukumarasamy, N, Santhanam, A, Asokan, V, Madurai Ramakrishnan, V, Sundaram, S & Velauthapillai, D **2020**, *Interfacing green synthesized flake like-ZnO onto TiO_2 as a bilayer electron extraction for efficient perovskite solar cells* ', **RSC - New Journal of Chemistry**, vol.44, pp.8422-8433. (**Impact factor 3.07**)

3. **Selvakumar, P**, Muthukumarasamy, N, Santhanam, A, Asokan, V, Madurai Ramakrishnan, V, Palanisamy, SE, Sundaram, S & Velauthapillai, D **2020**,*'A review on the classification of organic/inorganic/carbonaceous hole transporting materials for perovskite solar cell application',* **Arabian Journal of Chemistry**, vol. 13,no. 1,pp. 2526-2557. (**Impact factor 4.76**)

4. **Selvakumar, P**, Muthukumarasamy, N, Santhanam, A, Asokan, V, Madurai Ramakrishnan, V, Selvaraj, A, Rangasamy, B, Sundaram, S & Velauthapillai, D **2018** ,*'The Performance of $CH_3NH_3PbI_3$ - Nanoparticles based – Perovskite Solar Cells Fabricated by Facile Powder press Technique'*, **Materials Research Bulletin**, vol. 108,no.,pp. 61-72. (**Impact factor 4.02**)

5. **Selvakumar, P**, Muthukumarasamy, N, Ramakrishnan, VM, & Velauthapillai, D **2018**b,*'Nickel sulphide-carbon composite hole transporting material for ($CH_3NH_3PbI_3$) planar heterojunction perovskite solar cell'*, **Materials Letters**, vol. 221,no.,pp. 283-288. (**Impact factor 3.20**)

6. Venkatraman MR**,** Muthukumarasamy, N, Santhanam, A, **Selvakumar, P**, & Velauthapillai, D **2020**, *Transformation of TiO_2 nanoparticles to nanotubes by simple solvothermal route and its performance as dye-sensitized solar cell (DSSC) photoanode'*, **International Journal of Hydrogen Energy**, vol.45,no.8, pp.15441-15452. (**Impact factor 4.94**)

7. Venkatraman MR, **Selvakumar P**, Muthukumarasamy N, Agilan S, Dhayalan V, Arivalagan P **2020**, '*Performance of TiO_2 nanoparticles synthesized by microwave and solvothermal methods as photoanode in Dye-sensitized solar cells (DSSC)*', **International Journal of Hydrogen Energy**, (Just Accepted, In-press). (**Impact factor 4.94**)

8. Venkatraman MR, **Selvakumar P**, Muthukumarasamy N, Agilan S, Dhayalan V, Arivalagan P, **2020** '*UV-aided Graphene Oxide Reduction by TiO_2 towards TiO_2/Reduced Graphene Oxide (RGO) Composites for Dye-sensitized solar cells'*, **International Journal of Energy Research**, (Just Accepted, In-press). (**Impact factor 3.74**)

9. Venkatraman MR, **Selvakumar P**, Muthukumarasamy N, Agilan S, Dhayalan V, Arivalagan P, **2020**' *Microwave Assisted Solvothermal Synthesis of Quasi Cubic F Doped TiO_2 Nanostructures and its performance as Dye Sensitized Solar Cell photoanode*, '**International Journal of Energy Research**, (Just Accepted, In-press). (**Impact factor 3.74**)