

## PERSONAL INFORMATION

## KARTHICK SEKAR



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Sex Male | Date of birth 7 May 1991 | Nationality Indian, Place of birth - A. Kovilpatti, City - Madurai, State - Tamilnadu, India

## PERSONAL STATEMENT

An aspiring young Physics enthusiast who would like to take up a research career in Photovoltaics. Especially, to acquire proficiency in Perovskites Solar cell.

## EDUCATION AND TRAINING

2017–Present

### Ph.D. in Nano science & Nano technology

Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional (CINVESTAV - IPN), Mexico city (Mexico)

#### **Area of Interest:**

\*Synthesis of perovskites materials and their characterizations.

\*Experimental and theoretical analysis of perovskites.

**Title: “Synthesis and characterization of Hybrid perovskite (FAPbI<sub>3</sub>) solar absorbers inspired by the chalcopyrite structure”**

**Duration:** 2017 to till date (Expected date of completion March 2021)

**Summary:** Synthesis and characterization of Structural, Morphological, Electrical and Optical properties of Pure Formamidinium lead triiodide (FAPbI<sub>3</sub>) Perovskites performed experimentally as well as theoretically (first - principles calculations based on density functional theory (DFT) using material studio software) and exploring the possibilities to reduce the lead contents and fabrication of the perovskites photovoltaic structures; which in turn promise an environmental friendly high efficiency with improved stability.

2011–2015

### Master of Science (M.Sc) in Physics

Thiagarajar College of Arts & Science, Madurai, Tamilnadu (India)

**Title: “Orthogonalization of lattice parameters and calculation of unit cell similarity index of isostructural compounds retrieved from the Cambridge Structural Database.”**

**Duration:** six months

**Summary:** Isostructural compounds are compounds which exhibit similar packing. Isostructural crystal structures were retrieved from the CSD and were analyzed for the unit cell similarity index. Unit cell similarity is a prerequisite for isostructurality and isostructurality gives a better insight towards close packing. To calculate the unit cell similarity index, it is necessary to orthogonalize the lattice parameters. The value of the unit cell similarity index ( $\phi$ ) gives a measure of the extent of isostructurality. Isostructural compounds may or may not be isomorphous. But the structures which have been taken up here are not only isostructural but also isomorphous.

2008–2011

### Bachelor of Science (B.Sc) in Physics

S. Vellaichamy Nadar College (N.M.S.S.V.N ) of Arts & Science, Madurai, Tamilnadu (India)

2007–2008

### Higher Secondary Certificate (HSC)

Government Higher Secondary School, Palamedu, Madurai (India)

2005–2006 **Secondary School Leaving Certificate (SSLC)**  
Government Higher Secondary School, Palamedu, Madurai (India)

#### 2017–Present **Publications**

\***S. Karthick**, J.J. Ríos-Ramírez, S. Chakaravarthy, S. Velumani, “**Electrical, Optical, and Topographical Properties of RF Magnetron Sputtered Aluminum-doped Zinc Oxide (AZO) Thin Films Complemented by First-Principles Calculations**”, Journal of Materials Science: Materials in Electronics. (<https://doi.org/10.1007/s10854-018-8920-8>)

\* **S. Karthick**, J.J. Ríos-Ramírez, S. Velumani, “**12 Possible Orientations of organic Formamidinium cation and its structural analysis by First Principles calculations using Van der Waals-Density functional Theory**”, 15th International Conference on Electrical Engineering, Computing Science and Automatic Control (CCE), Mexico City, Mexico. September 5-7, 2018. (doi: 10.1109/ICEEE.2018.8533994).

#### 2009–Present **Workshops/Seminars**

\*15th International Conference on Electrical Engineering, Computing Science and Automatic Control (CCE), 2018, Sep 5 - 7, Mexico City, Mexico.

\*XXVII International materials Research Congress, IMRC 2018, August 19 – 24, Cancun, Mexico.

\*XXVI International Materials Research Congress, IMRC 2017, August 20 – 25, Cancún, México.

\* Science exhibition and awareness workshop, Indian Institute of Geomagnetism, Tirunelveli, Feb 2012.

\*National level technical symposium Tecuthsav '11, Thiagarajar college of engineering, Madurai, March 2011.

\*Awareness and panel discussion on India based Neutrino observatory (INO) project, Arul anandar college, Madurai, March 2010.

\*Application of radiation in research, industry and society (ARRIS), Arul anandar college, Madurai, Feb 2009.

\*Attended various seminars and conferences.

#### **Achievements**

\*Second rank holder in Part III physics of B.SC degree examination.

\*Won first prize in Quiz at NIT, Trichy.

\*Won third price in model display at Tecuthsav '11. National level symposium, Madurai.

#### WORK EXPERIENCE

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2015–2017 **Part - time tuition tutor**  
A. P. J. Abdul kalam tuition center, Palamedu, Madurai, Tamilnadu (India)  
\* taking a physics class for higher secondary school students

#### PERSONAL SKILLS

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Mother tongue(s) Tamil

| Foreign language(s) | UNDERSTANDING |         | SPEAKING           |                   | WRITING |
|---------------------|---------------|---------|--------------------|-------------------|---------|
|                     | Listening     | Reading | Spoken interaction | Spoken production |         |
| English             | C1            | C1      | B2                 | B2                | B2      |
| Spanish             | A1            | A2      | A1                 | A1                | A1      |

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user

Communication skills I have a good communication skills gained through my experience as a Ph.D. scholar.

Organisational / managerial skills I have a good leadership skills gained through my experience as a cricket captain.

Job-related skills I have a good understanding & analyzing capabilities to work with others and I have a good command skills to control the surroundings.

| Digital skills | SELF-ASSESSMENT        |                  |                  |                  |                  |
|----------------|------------------------|------------------|------------------|------------------|------------------|
|                | Information processing | Communication    | Content creation | Safety           | Problem solving  |
|                | Proficient user        | Independent user | Independent user | Independent user | Independent user |

\* I successfully completed the computer course on Diploma in Computer application (D.C.A).

Other skills  
 \*Drawing  
 \*Photography  
 \*Listening Music  
 \*Playing Cricket