KUMARESH HALDER, Ph.D.

Assistant Professor | Regent Education & Research Group of Institutions

Kolkata 700 116, India | h.kumaresh89@gmail.com

Google Scholar | ORCID | Scopus | Web of Science

RESEARCH PROFILE

Ph.D. in Physics with research experience in functional ceramic materials, polymer nanocomposites, and carbon-based nanomaterials. Research interests focus on the relationships between composition, microstructure, interfaces, and functional properties of advanced materials for electronic and biomedical applications. Research activities include materials synthesis, characterization, and performance evaluation, with emphasis on dielectric materials, composite systems, and graphene-based nanocomposites. Research outputs comprise 13 peer-reviewed journal articles, 3 book chapters, and 2 patent applications.

RESEARCH INTERESTS

- Functional Ceramic and Electronic Materials
- Polymer Nanocomposites and Composite Materials
- Carbon and Carbon-Based Nanomaterials
- Structure–Property Relationships in Advanced Materials
- Materials Design for Electronic and Biomedical Applications

EDUCATION

Ph.D. in Physics | 2016
Jadavpur University, Kolkata, India
Thesis: *Development and Characterization of Transition Metal Doped Aluminosilicate and Their Polymeric Nano Composites: Study of Their Electrical Properties and Possible Applications.*
Supervisor: Dr. Sukhen Das

M.Sc. in Electronics | 2012
West Bengal State University, Barasat, India
Dissertation: Development of Digital Opisometer for Curvy Length Measurement

B.Sc. (Honours) in Electronics | 2010
University of Calcutta, Kolkata, India

ACADEMIC APPOINTMENTS

Assistant Professor (Undergraduate Bachelor of Technology Programme) | January 2021 – Present
Department of Basic Science and Humanities
Regent Education and Research Foundation Group of Institutions, India

Guest Lecturer (Postgraduate Master of Science Programme) | August 2017 – June 2022; September 2024 – Present
Department of Electronics
West Bengal State University, India

RESEARCH FUNDING AND PROJECTS

Principal Investigator
Predictive Interface Engineering of Graphene/Piezoelectric Nanocomposites for Self-Powered Electromechanical Devices
ANRF Use-Inspired Basic Research Programme (ARG), Government of India
Pre-Proposal Submitted
File No.: ANRF/ARG/2026/008780
Submission Date: 10 June 2026
Status: Under Evaluation

RESEARCH OUTPUTS AND CITATION METRICS

Peer-Reviewed Journal Articles: 13
Book Chapters: 3
Patent Applications: 2
Google Scholar Citations: 121+
h-index: 10
i10-index: 5

SELECTED PUBLICATIONS

Q1 JOURNALS

Mandal, D., Chattopadhyay, H., and **Halder, K.** (2023).
Constitutive modelling of human cornea through fractional calculus approach.
Physics of Fluids, 35(3), 031907.
DOI: https://doi.org/10.1063/5.0138730

Paul, B.K., **Halder, K.**, Roy, D., Bagchi, B., Bhattacharya, A., and Das, S. (2014).
Abrupt change of dielectric properties in mullite due to titanium and strontium incorporation by sol–gel method.
Journal of Advanced Ceramics, 3(4), 278–286.
DOI: https://doi.org/10.1007/s40145-014-0119-8

Q2 JOURNALS

Halder, K., Paul, B.K., Bhattacharya, A., and Das, S. (2016).
Influence of nickel ion doped mullite composite on electrical properties, phase behavior and microstructure of poly(vinylidene fluoride) matrix.
Journal of Polymer Research, 23, 133.
https://doi.org/10.1007/s10965-016-1027-0

Halder, K., Roy, D., and Das, S. (2015).
A comparative electrical study of nano-crystalline mullite with low dielectric loss due to incorporation of tungsten and molybdenum ion: Their uses in electronic industries.
Journal of Materials Science: Materials in Electronics, 26(8), 5803–5811.
https://doi.org/10.1007/s10854-015-3139-4

Halder, K., Roy, D., Bhattacharya, A., and Das, S. (2015).
High-K tungsten–mullite composite for electronic industrial application: Synthesis and study of its microstructure, phase behavior and electrical properties.
Journal of Materials Science: Materials in Electronics, 26(2), 1172–1180.
https://doi.org/10.1007/s10854-014-2521-y

Paul, B.K., **Halder, K.**, Roy, D., Bagchi, B., Bhattacharya, A., and Das, S. (2014).
Dielectric switching above a critical frequency occurred in iron mullite composites used as an electronic substrate.
Journal of Materials Science: Materials in Electronics, 25(12), 5218–5225.
https://doi.org/10.1007/s10854-014-2291-6

Q3 JOURNALS

Mandal, D., **Halder, K.**, and Bag, S. (2025).
Nanomaterials in medical imaging: Breakthroughs, challenges, and prospects.
Trends in Biomaterials & Artificial Organs, 39(4), 342–351.
https://doi.org/10.5281/zenodo.17462012

Mandal, D., Chattopadhyay, H., and **Halder, K.** (2023).
Development of silica–collagen hybrid as corneal substitute through sol–gel route.
BioNanoScience, 13, 2441–2447.
https://doi.org/10.1007/s12668-023-01146-6

SELECTED BOOK CHAPTERS

Mandal, D., Bag, S., and **Halder, K.** (2025).
TeleHealthcare and its Advancement.
In Artificial Intelligence in e-Health Framework: Telemedicine Applications, Drug Delivery, Augmented Reality, and Robotics (Vol. 2).
Elsevier.

Halder, K., Mandal, D., Ganguly, K., Sikdar, S., and Bag, S. (2022).
The effects of metal ion doped ceramic fillers into poly(vinylidene fluoride) matrix: A comparative investigation and its application in micro-electronics industry.
Springer.

PATENT APPLICATIONS

Dutta, J., **Halder, K.**, Bhattacharjee, S., Das, A., Maity, M., and Dey, P. (2025).
Quantum-Well-Based Nano-Mixed PIN Photodetector for UV–Visible–IR Detection.
Indian Patent Application.
Diary No.: LD-49327/2025-CO

Chakraborty, A., Bhattacharjee, B., **Halder, K.**, Bhattacharjee, S., Banerjee, D., Shaw, D.K., Singha, K., Mollick, M., Sadhukhan, S., and Layek, S. (2025).
Hydrogen Energy Plant Operated Electric Vehicle Lead-Acid Battery Charging Station.
Indian Patent Application.
Diary No.: LD-50404/2025-CO

TECHNICAL EXPERTISE

Materials Synthesis and Processing: Sol–gel processing, ceramic composite fabrication, polymer nanocomposite fabrication, graphene oxide and reduced graphene oxide processing.

Materials Characterization: X-ray Diffraction (XRD), Fourier Transform Infrared Spectroscopy (FTIR), Differential Thermal Analysis (DTA), Thermogravimetric Analysis (TGA), dielectric and electrical characterization, SEM-based microstructural analysis.

Computational and Analytical Tools: MATLAB, GNU Octave, OriginPro, FullProf, LAMMPS.

PROFESSIONAL SERVICE

Journal Reviewer

- Journal of Surface Engineered Materials and Advanced Technology, Scientific Research Publishing
- Helion, Cell Press Publishing.

AWARDS AND HONOURS

UGC-BSR (Basic Scientific Research) Fellowship in Science
University Grants Commission (UGC), Government of India
Awarded: 19 June 2014 | Tenure: 2014–2016

Bronze Medal for Securing Second Position in B.Sc. (Honours) Electronics
Department of Electronics, Bhairab Ganguly College | 2010

PROFESSIONAL MEMBERSHIPS

Life Member
Society for Materials Chemistry (SMC), Bhabha Atomic Research Centre (BARC), India

Life Member
Biomedical Engineering Society of India (BMESI)