



Dr. Rajeev Kumar

R&D Scientist — Advanced Materials, Nanocomposites & 2D Nanomaterials

95 publications • h-index 39 • i10-index 68 • 3,672 citations • 32 first/corr.-author • 2 patents • 2 book chapters

Materials scientist with 6+ years post-PhD experience spanning energy storage, 2D nanomaterials, EMI shielding, corrosion coatings, and radiation-hardened ceramics. Inventor on 2 granted Korean patents; author of 2 book chapters; editorial board member of 3 journals.

PROFESSIONAL EXPERIENCE

Postdoctoral Researcher (NSF-PREM) | Nov 2023 – Present

North Carolina Central University, Durham, NC | Advisor: Prof. Fei Yan

- ▶ Synthesised 2D TMDs (MoS_2 , ReS_2 , WS_2 , $\text{Bi}_2\text{O}_2\text{Se}$) via solvothermal/CVD for electrocatalysis, sensing, and photodetection; 6 first/corresponding-author papers (2024–2026), highest IF 26.8.
- ▶ Automated Python based toolkits for electrochemical data analysis via Claude Code.
- ▶ Mentored 4 graduate and 8 undergraduate researchers.

Adjunct Instructor — General Chemistry I & II | Jun 2025 – Present

North Carolina Central University, Durham, NC

- ▶ Taught lab sections (~25 students/section).

Postdoctoral Researcher — Energy Materials | Oct 2021 – Oct 2023

University of Ulsan, Republic of Korea | Advisor: Prof. Youngil Lee

- ▶ Designed LiFeBO_3 cathode and carbon-coated Fe_3BO_5 anode through controlled carbothermal synthesis; both translated to 2 granted Korean patents.
- ▶ MOF-derived Fe/M-N_4 on N-doped carbon for bifunctional ORR/OER and HER; demonstrated superior mass activity vs. commercial Pt/C in alkaline media.
- ▶ Mentored 2 MSc students on electrode fabrication and coin-cell testing protocols.

CSIR Research Associate | Jan 2021 – Aug 2021

CSIR–CECRI, Chennai | Advisor: Prof. A.S. Prakash

- ▶ Synthesised and characterized LLZO/NASICON solid-state electrolytes.
- ▶ Designed FeCoCr@N-C bifunctional ORR/OER catalyst; co-authored 3 papers on Fe-based electrocatalysts during 8-month tenure.

Research Associate | Jan 2019 – Jan 2020

Materials Research Centre, IISc, Bengaluru | Advisor: Prof. Balaram Sahoo

- ▶ $\text{Fe/Fe}_3\text{C@C/PVDF}$ nanocomposites: RL –40.5 dB, total SE 55.3 dB at 5 GHz; microwave absorption.
- ▶ Gamma-irradiation (5 Gy–50 kGy) study of MnZn ferrites via ^{57}Fe Mössbauer spectroscopy.
- ▶ GO coatings fully suppressed Fe oxidation at 3X seawater salinity.
- ▶ Transition metal incorporated carbon nanostructures developed for non-linear optical absorption.

SELECTED PUBLICATIONS

[IF 26.8] R. Kumar*, A.K. Shringi* et al., "Substitutional doping of 2D TMDs for device applications: challenges and prospects," Mater. Sci. Eng. R, 163 (2025) 100946.

[IF 6.3] R. Kumar, S. Kumar, et al., "N-doped carbon with FeCoCr alloy nanoparticles as Zn–air electrocatalysts," J. Alloys Compd., 984 (2024) 173862.

[185+ cit.] R. Kumar*, H.K. Choudhary* et al., "Carbon encapsulated $\text{Fe/Fe}_3\text{C}$ /graphite nanoparticles for EMI shielding and microwave absorption," Phys. Chem. Chem. Phys., 19 (2017) 23268–23279.

PATENTS GRANTED — REPUBLIC OF KOREA

- ▶ KR Patent No. 10-2852781 (IPC H01M) — "Cathode Active Material for Lithium Secondary Batteries and Method for Preparing the Same". Y. Lee, R. Kumar, J. Kim. App. No. 10-2023-0007813. Granted Aug 26, 2025.
- ▶ KR Patent No. 10-2939024 (IPC H01M) — "Anode Active Material Containing Carbon-Coated Vonsenite (Fe_3BO_5), Method for Manufacturing the Same, and Anode Including the Same." Y. Lee, R. Kumar, J. Kim. App. No. 10-2023-0050474. Granted Mar 10, 2026.

CONTACT

rkumar@nccu.edu

+1-919-225-6091 / +91-8789990541

Durham, NC 27707, USA

[LinkedIn Profile](#)

[Google Scholar](#)

[Personal Website](#)

[GitHub: github.com/rajeev4187](#)

[ORCID: 0000-0002-5436-2352](#)

MATERIALS EXPERTISE

- 2D nanomaterials: TMDs, graphene
- Carbon nanostructures & nanocomposites
- Corrosion-protection coatings (GO/rGO)
- Energy storage: Li/Na-ion, supercaps
- Magnetorheological fluids
- EMI shielding & microwave absorption
- Radiation-hardened ferrite ceramics
- Non-linear optical absorption

SYNTHESIS METHODS

Solvothermal • CVD • Sol-gel • Pyrolysis
Co-precipitation • Wet-chemical • Ball-milling

CHARACTERIZATION

^{57}Fe Mössbauer • XRD • XPS • SEM-EDX
Raman • BET • FT-IR • RDE/RRDE
Electrochemistry

SOFTWARE

Python • VS Code • EC-Lab • Origin
AfterMath • EIS fitting • ML (scikit-learn)

EDUCATION

PhD Materials Sci. — IISc, 2019
MSc. Chemistry — BHU, 2014
MBA Operations — SMU-DE, 2012
BSc. Chemistry — BHU, 2010

AWARDS & SERVICE

- CSIR JRF-NET AIR-48 (2012)
- CSIR Research Associate Fellowship (2019)
- Best Oral — KCS Symposium, Jeju 2023
- Assoc. Editor, Frontiers in Carbon

REFERENCES

Prof. Fei Yan NCCU, Durham NC fyan@nccu.edu	Dr. Manoj Prasad NCCU, Durham NC mprasad@nccu.edu
--	--