Dr. Alik Sundar Majumdar

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Summary

Assistant Professor with 9+ years of professional experience (institutional plus R & D laboratories) in the field of Basic Geosciences through undergraduate and postgraduate teaching, student training program on geological field studies, and cutting- edge research in the fields of **Planetary Exploration**, **Critical Metal Exploration**, **Mineral Spectroscopy**, and **Fluid-Mineral Interaction**.

Experience

Department of Applied Geology, IIT (ISM) | Jharkhand, India
Assistant Professor | 04/2019 - Present

Geosciences Division, Physical Research Laboratory (A Unit of Department of Space, Govt. of India), | Gujarat, India
DST-INSPIRE Faculty | 10/2017 - 03/2019

Department of Earth Sciences, IIT Bombay | Mumbai, India
Postdoctoral Fellow | 07/2015 - 06/2017

Geosciences Division, Physical Research Laboratory (A Unit of Department of Space, Govt. of India), | Gujarat, India
Summer Intern | 05/2009 - 08/2009

Education

Institut Für Mineralogie, WWU Münster | Münster, Germany
Dr. rer. nat. (Ph. D. equivalent), Mineralogy | 04/2015

- Thesis Title: The role of fluid infiltration and temperature on compositional evolution during peridotite alteration: Application to the Nuasahi Massif, India
- Grade: magna cum laude (very good).

Department of Earth Sciences, IIT Bombay | Mumbai, India
M.Sc. (Applied Geology) | 05/2010

- CGPA: 8.94/10

Presidency College, The University of Calcutta | Kolkata, India
B. Sc. (Geology Hons.) | 07/2008

- Percentage: 64.25%

Sree Sree Ramkrishna Vidyapith | Suri, West Bengal
Higher Secondary (10+2) | 04/2005

- Percentage: 81.70%

Research Interests

- Planetary Exploration
- Critical Metal Exploration
- Mineral Spectroscopy
- Fluid-Mineral Interaction

R & D Projects

As PI:

- **Abiotic synthesis of methane at the recess of Martian crust and prospect for microbial life in the Noachian Mars - Constraints from experimental and meteoritic studies.**
  - Duration: 10/2022 - 10/2025
  - Funding agency: ISRO RESPOND

- Grant value: INR 28.27 Lakhs

- **Textural - compositional evolution in olivine-gabbro and troctolite during interaction with out-of equilibrium aquesous solutions: Insights into the alteration in lower oceanic crust.**
  - Duration: 10/2017 - 10/2022
  - Funding agency: DST - INSPIRE
  - Grant value: INR 35.00 Lakhs

- **Textural-compositional investigation of peridotite alteration in ultraslow-spreading ridges (Central Indian Ridge).**
  - Duration: 06/2019 - 06/2022
  - Funding agency: IIT (ISM) Dhanbad
  - Grant value: INR 13.50 Lakhs

As Co-PI:

- **Characterization of sulfide minerals in Indian basemetal and gold deposits for assessment of strategic element recovery opportunity.**
  - Duration: 07/2023 - 07/2026
  - Funding agency: DST-SERB
  - Grant value: INR 56.76 Lakhs

Teaching

Undergraduate Courses:

- Crystallography and Optical Mineralogy (Theory + Practical)
- Descriptive Mineralogy (Theory)
- Introduction to Petrology (Theory + Practical)
- Earth Science Modular (Theory)

Postgraduate Courses:

- Sample Preparation and Analytical Techniques in Geosciences (Theory)
- Modern Instrumental Methods in Exploration Geosciences (Theory)
- Programming in MATLAB (Theory)
- Computer Application in Geology (Theory + Practical)
- Igneous Petrology (Theory + Practical)
- Applied Geochemistry (Theory + Practical)

Ph. D. Supervision

Ongoing:

- Mr. Swapnanil Bakshi
- Mr. Sk. Md. Aquib
- Ms. Navanita Saha
- Mr. Avirup Bose
- Mr. Sapneswar Sahoo

Scholarly Achievements

- DST - INSPIRE Faculty Award - Department of Science and Technology, Govt. of India - 2017 - 2022
- DAAD Forschungsstipendien für Doktoranden - 2011 - 2015 - A full scholarship for a period of 3+ years for further academic study and training in Germany
- All India Rank (AIR) - 15 in National Eligibility Test (NET) in Earth, Atmospheric, Ocean and Planetary Sciences - 2010
- All India Rank (AIR) - 7 in Joint Admission test for M. Sc. (JAM) in Applied Geology - 2008

Publications

1. Chakraborty, P., Singh, S., Hazra, B., **Majumdar, A. S.**, Kumari, J., **2024**. Spatial distribution, source apportionment, and health risks assessment of trace elements in pre- and post-monsoon soils in the coal-mining region of North

Karanpura basin, India. **Science of The Total Environment**, 177173. DOI: https://doi.org/10.1016/j.scitotenv.2024.177173
2. **Majumdar, A. S.,** Ray, D., Shukla, A. D., **2020**. Serpentinization of olivine-gabbro in Central Indian ridge: Insights into H2 production during alteration in lower oceanic crust and sustenance of life at slow-spreading ridges. **Lithos**, 105730. DOI: https://doi.org/10.1016/j.lithos.2020.105730.
3. Chakraborty, S., **Majumdar, A. S.,** Shukla, A. D., **2020**. Role of fluid in strain softening within the Main Central Thrust in Sikkim: The origin of quartz-rich mylonites. **Journal of Structural Geology**, 104145. DOI: https://doi.org/10.1016/j.jsg.2020.104145.
4. Scicchitano, M. R., Rubatto, D., Hermann, J., **Majumdar, A.S.**, Putnis, A., **2018**. Oxygen isotope analysis of olivine by ion microprobe: Matrix effects and applications to a serpentinised dunite. **Chemical Geology**, 499, 126-137.
5. Bhushan, R., Sati, S. P., Rana, N., Shukla, A. D., **Majumdar, A. S.,** Juyal, N., **2018**. High-Resolution millennial and centennial scale Holocene monsoon variability in the Higher Central Himalayas. **Palaeogeography, Palaeoclimatology, Palaeoecology**, 489, 95-104.
6. **Majumdar, A.S.,** Hövelmann, J., Mondal, S.K., Putnis, A., **2016**. The role of reacting solution and temperature on compositional evolution during harzburgite alteration: Constraints from the Mesoarchean Nuasahi Massif, eastern India. **Lithos**, 256-257, 228-242.
7. **Majumdar, A.S.,** Hövelmann, J., Vollmer, C., Berndt, J., Mondal, S.K., Putnis, A., **2016**. Formation of Mg-rich olivine pseudomorphs in serpentinized dunite from the Mesoarchean Nuasahi Massif, eastern India: Insights into the evolution in fluid composition at the mineral-fluid interface. **Journal of Petrology**, 57 (1), 3-26.
8. **Majumdar, A.S.,** Mathew, G., **2015**. Raman-Infrared (IR) spectroscopy study of natural cordierites from Kalahandi, Odisha. **Journal of the Geological Society of India**, 86, 80-92.
9. **Majumdar, A.S.,** King, H.E., John, T., Kusebauch, C., Putnis, A., **2014**. Pseudomorphic replacement of diopside during interaction with (Ni,Mg)Cl2 aqueous solutions: Implications for the Ni-enrichment mechanism in talc- and serpentine-type phases. **Chemical Geology**,380, 27-40.
10. **Majumdar, A.S.,** Mathew, G., **2012**. Distinct ruby suite at Sardapur, Orissa: A spectroscopic investigation. **Journal of the Geological Society of India**, 80, 715-722.

Conference Abstracts

1. Bose, A., **Majumdar, A. S.**, Ray, D., **2024**. Investigation of martian alteration process from terrestrial analogue study using scanning electron microscopy and electron microprobe. EMSI 2024, IIT Bombay.
2. Das, A., **Majumdar, A. S.**, Ray, D., **2024**. Aqueous alteration in Nakhlites. MetMess 2022, PRL.
3. Bose, A., Das, A., **Majumdar, A. S.**, Ray, D., **2024**. Insights on martian alteration process from terrestrial analog study on olivine-to-clay replacement. ICEPH 2024, PRL.
4. Das, A., **Majumdar, A. S.**, and Ray, D., **2023**. Meteorite found in Antarctica - Unlock the aqueous history of Mars. Indian Planetary Science Conference 2023, PRL Ahmedabad, 22-24th Mar 2023.
5. Das, A., **Majumdar, A. S.**, and Ray, D., **2022**. Secondary minerals in Nakhla meteorite: Implications for hydration of Martian crust. MetMeSS Conference 2022, PRL Ahmedabad, 24-25th Nov 2022.
6. Chakraborty, S., **Majumdar, A. S.**, and Mukul, M., **2017**. Fluid-assisted ductile deformation in the Main Central Thrust, Sikkim Himalaya, India. AGU FALL Meeting, 12-16th Dec 2016.
7. **Majumdar, A.S.**, Salvi, D., Borgohain, B., and Mathew, G., **2015**. Antigorite polysomatism during prograde metamorphism of TransHimalayan Tidding peridotite, eastern Arunachal Pradesh, India. HKT2015 Conference, 6-8th Sept 2015.
8. **Majumdar, A.S.**, King, H.E., John, T., Kusebauch, C., and Putnis, A., **2013**. Pseudomorphic replacement of diopside during interaction with (Ni,Mg)Cl2 aqueous solutions. Goldschmidt2013 Conference Abstracts, Min. Mag. 77(5), 1674.
9. **Majumdar, A.S.**, King, H.E., Kusebauch, C., and Putnis, A., **2012**. Pseudomorphic replacement of diopside during interaction with (Ni,Mg)Cl2 aqueous solutions. European Mineralogical Conference, 2-6 Sept 2012, Frankfurt, Germany.

Invited Talks

- **Title**: Advancements in Planetary and Critical Metal Explorations in India and Recent Challenges
  - Venue: Isotope and Radiation Application Divisional Colloquium, Bhaba Atomic Research Centre, Mumbai, India
  - Date: 16 Oct 2024
- **Title:** Serpentinization of iron-rich olivine and its potential for abiotic methane synthesis in planetary bodies
  - Venue: MetMess 2022, Planetary Sciences Division, PRL, Ahmedabad, Gujarat, India
  - Date: 25 Nov 2022
- **Title:** Serpentinization of iron-rich olivine and its potential for abiotic methane synthesis in planetary bodies.
  - Venue: Planetary Sciences Division, PRL, Ahmedabad, Gujarat, India

    - Date: 25 Nov 2021
- **Title:** A Serpentine Story on the Origin of Life
    - Venue: Department of Geology, K J Somaiya College of Science and Commerce, Mumbai, India
    - Date: 04 July 2020

Administrative Roles

- **Faculty-in-Charge, JRF**, Dept. of Appl. Geol., IIT (ISM) Dhanbad - 04/2020 - present
- **Departmental Co-ordinator**, **International Student Mobility Program**, IIT (ISM) Dhanbad - 04/2020 - present
- **Faculty-in-Charge, ICP-OES Facility**, Central Research Facility, IIT (ISM) Dhanbad - 04/2019 - 08/2023

Mailing Address

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