

Dr. Alik Sundar Majumdar

Assistant Professor, DAAD Fellow

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Assistant Professor with 10+ years of professional experience (institutional plus R & D laboratories) in the field of Applied Geosciences through undergraduate and postgraduate teaching, field-based training programs, and cutting - edge research in the domain of Phyllosilicate Mineralogy and its application in the Earth system sciences, critical mineral exploration, planetary exploration, astrobiology, waste-to-wealth, and societal benefits.

Work Experience

- 2019-04 - present **Assistant Professor**
Department of Applied Geology, IIT (ISM) Dhanbad, Dhanbad, India
- 2017-10 - 2019-03 **DST-INSPIRE Faculty**
Geosciences Division, Physical Research Laboratory, Department of Space, Ahmedabad, India
- 2015-07 - 2017-06 **Postdoctoral Fellow**
Department of Earth Sciences, IIT Bombay, Powai, Mumbai, India
- 2009-05 - 2009-07 **Summer Intern**
Geosciences Division, Physical Research Laboratory, Department of Space, Ahmedabad, India

EDUCATION

- 2011-10 - 2015-04 **Mineralogy, Dr. rer. nat.**
Institut Für Mineralogie, WWU Münster, Münster, Germany
Doctoral thesis: The Role of Fluid Infiltration and Temperature on Compositional Evolution during Peridotite Alteration: Application to the Nuasahi Massif, India
- 2008-07 - 2010-05 **Applied Geology, M. Sc.**
Department of Earth Sciences, IIT Bombay, Mumbai, India
M. Sc. thesis: Spectroscopic Investigation on Gem Corundum and Cordierites from Kalahandi, Odisha, India
- 2005-07 - 2008-06 **Geology, B. Sc. (Hons.)**
Presidency College, University of Calcutta, Kolkata, India
- 2008-06 **Science, Higher Secondary (10 + 2)**
Sree Sree Ramkrishna Vidyapith, Suri, Birbhum, West Bengal, India



Awards and Achievements

2017-10 - 2019-03	<i>DST - INSPIRE Faculty Award</i>
2011-05 - 2015-04	<i>German Academic Exchange Service (DAAD) Ph. D. Fellowship</i>
2010-06	<i>All India Rank (AIR) - 15 in National Eligibility Test (NET) in Earth, Atmospheric, Ocean and Planetary Sciences</i>
2008-05	<i>All India Rank (AIR) - 7 in Joint Admission test for M. Sc. (JAM) in Applied Geology</i>



Research Interests

Phyllosilicate Mineralogy: Its Fundamental and Applied Aspects

- *Control of Phyllosilicates on the Chemical Feedback Processes at the Lithosphere - Hydrosphere Interfaces.*
- *Role of Phyllosilicates on the Origin of Life, Evolution of Biosphere and Astrobiology.*
- *Application of Phyllosilicates (Serpentine, Clay) in Planetary Exploration.*
- *Critical Mineral Resource Potential and Recovery Opportunities of Phyllosilicates (Clay, Mica).*
- *White Hydrogen Generation Pathways during Phyllosilicate Formation.*
- *Societal Applications of Phyllosilicates (Clay, Serpentine).*
- *Role of Phyllosilicates in Waste Disposal and Waste-to-Wealth.*
- *Phyllosilicates as Geoheritage Materials.*



Projects

2025-04 - 2028-03	Evaluation of Lithium and Rare Earth Elements Resource Potential in Jharkhand Laterite Deposits using Nuclear Analytical and Spectroscopic Techniques (Role: PI) <i>Funding Agency: University Grant Commission - Department of Atomic Energy Consortium for Scientific Research</i> Grant value: Nil (Free analytical facility at BARC, Mumbai)
2023-07 - 2026-07	Characterization of Sulfide Minerals in Indian Basemetal and Gold Deposits for Assessment of Strategic Element Recovery Opportunity (Role: Co-PI) <i>Funding Agency: Department of Science and Technology (DST-SERB)</i> Grant value: INR 56.76 Lakhs
2022-10 - 2025-10	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 (Role: PI) <i>Funding Agency: Indian Space Research Organization (ISRO), Govt. of India</i> Grant value: INR 28.27 Lakhs
2017-10 - 2022-10	Textural - Compositional Evolution in Olivine-Gabbro and Troctolite during Interaction with Out-Of Equilibrium Aqueous Solutions: Insights into the Alteration in Lower Oceanic Crust (Role: PI) <i>Funding Agency: Department of Science and Technology (DST-INSPIRE)</i> Grant value: INR 35.00 Lakhs
2019-06 - 2022-06	Textural-Compositional Investigation of Peridotite Alteration in Ultraslow-Spreading Ridges (Central Indian Ridge) (Role: PI) <i>Funding Agency: IIT (ISM) Dhanbad</i> Grant value: INR 13.50 Lakhs

Journal publications:

- Sahoo, S., **Majumdar, A. S.***, Anand, R., Ray, D., Fuenlabrada, J. M., **2025**. Petrogenesis of Mafic–Ultramafic Cumulates in the Mayudia Ophiolite Complex, NE Himalaya: Evidence of an Island Arc Root in Eastern Neo-Tethys. **Minerals**, 15 (6), 572. (IF: 2.2)
- 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**, 955, 177173. (IF: 8.0)
- **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**, 374-375, 105730. (IF: 2.5)
- 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**, 140, 104145. (IF: 2.9)
- 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. (IF: 3.6)
- 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. (IF: 2.7)
- **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. (IF: 2.5)
- **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. (IF: 3.5)
- **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. (IF: 1.5)
- **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. (IF: 3.6)
- **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. (IF: 1.5)

Conference Abstracts:

- Bose, A., **Majumdar, A. S.**, Ray, D., **2025**. Delving into Olivine-Clay replacement in Terrestrial Analog: Insights on Martian alteration process. **Goldschmidt 2025 Conference**. Prague, Czech Republic.
- Saha, N., **Majumdar, A. S.**, Ray, D., **2024**. Characterization of Hydrous Sulfates in Matanomadh Formation - A Martian Analog. **MetMess 2024**. PRL, Ahmedabad, India
- 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, India
- Das, A., **Majumdar, A. S.**, Ray, D., **2024**. Aqueous alteration in Nakhilites. **MetMess 2022**, PRL, Ahmedabad, India.
- 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, Ahmedabad, India
- Das, A., **Majumdar, A. S.**, and Ray, D., **2023**. Meteorite found in Antarctica - Unlock the aqueous history of Mars. **IPSC 2023**, PRL Ahmedabad, India.
- Das, A., **Majumdar, A. S.**, and Ray, D., **2022**. Secondary minerals in Nakhla meteorite: Implications for hydration of Martian crust. **MetMeSS 2022**, PRL Ahmedabad, India.
- Chakraborty, S., **Majumdar, A. S.**, and Mukul, M., **2017**. Fluid-assisted ductile deformation in the Main Central Thrust, Sikkim Himalaya, India. **AGU FALL Meeting**, USA.
- **Majumdar, A. S.***, Salvi, D., Borgohain, B., and Mathew, G., **2015**. Antigorite polysomatism during prograde metamorphism of Trans Himalayan Tidding peridotite, eastern Arunachal Pradesh, India. **HKT2015**, India.
- **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**, Min. Mag. 77(5), 1674.
- **Majumdar, A. S.***, King, H.E., Kusebauch, C., and Putnis, A., **2012**. Pseudomorphic replacement of diopside during interaction with (Ni,Mg)Cl₂ aqueous solutions. **EMC 2012**, Frankfurt, Germany.

(First / corresponding authorship is with asterix)