

## CURRICULUM VITAE

*Name:* : **MRUGANKA KUMAR PANIGRAHI**

*Date of Birth* : 10<sup>th</sup> April, 1964

*Present Position* : Professor of Geology (Higher Administrative Grade)

*Address for communication* : Department of Geology & Geophysics, I.I.T., Kharagpur  
(WB) India 721302  
e-mail: [mkp@gg.iitkgp.ernet.in](mailto:mkp@gg.iitkgp.ernet.in) Fax: +91-3222-255303/282268

*Education:* : Ph.D. (IIT Kharagpur) 1992

*Title of Ph.D. thesis* : **Copper-molybdenum mineralization and associated granitoids at Malanjkhand, M.P., India**

*Awards/Honors/Distinction* : I) Awarded with Prof. N.N.Chatterjee Medal by the **Asiatic Society** for conspicuously important contribution to Economic Geology, 1993  
II) **Young Scientist Project Award, 1993**, Department of Science & Technology, Government of India.  
III) Indian Society of Applied Geochemists Medal, 2011

*Extracurricular distinction* : President's Scout

*Career chronology (teaching and research)*

1. August 2015 – present : Professor of Geology (HAG), IIT Kharagpur
2. Feb 2009- July 2015 : Professor of Geology, I.I.T., Kharagpur
3. August 2004 to January 2009 : Associate Professor of Geology, IIT Kharagpur
4. Feb.1998 to July, 1994 : Assistant Professor of Geology, I.I.T., Kharagpur
5. Aug. 1995 to Feb. 1998 : Visiting Lecturer in Geology, I.I.T., Kharagpur
6. Dec. 1993 to July 1995 : Lecturer in Geology, University of Allahabad, India
7. April, 1992 to Nov. 1993 : Research Associate (C.S.I.R., Ministry of HRD, Gov. of India) affiliated to Jadavpur University, Calcutta, India (associated with a book-writing project – Ore Genesis: A Holistic Approach by A. Mookherjee, Allied Pub., New Delhi, 1999)
8. Feb. 1988 to Mar. 1992 : Research Fellow (Ministry of HRD sponsored), Department of Geology & Geophysics, IIT, Kharagpur

*Broad Area of Specialization* : **Ore Geology & Geochemistry**

*Fields of Expertise* : Ore Petrography, Fluid Inclusion Studies, Laser Raman Microspectrometry, Aqueous Geochemistry and Mineral-fluid Equilibria, Granite Pterogenesis, Computer Applications, Mathematical and Statistical Analysis of Geological and Geochemical Data; Mineral Economics and Exploration, Analytical Geochemistry

<i>Research Grants</i>	: Total 9 sponsored projects (from various Governmental Agencies amounting to amounting to approximately 18 million INR)
<i>Facilities Developed / Managed</i>	: Fluid Inclusion Microthermometry, Laser Raman and FTIR Spectrometry; LA ICP MS, Ion Chromatography; X-Ray Fluorescence Spectrometer (Instrumental in development of facilities worth 30 million INR through Governmental Funding)
<i>Research guidance</i>	: Thirteen Completed; Three ongoing
<i>Teaching : Graduate level</i>	: Mineral Exploration; Geostatistics; Pattern Recognition in Geosciences; Instrumental Methods of Analysis; Water-rock interaction
<i>: Undergraduate Level</i>	Mineral Resources, Modelin and Simulation of Geological Processes
<i>Number of M.Sc. theses guided</i>	: 30
<i>Number of M.Tech. thseses guided</i>	: Six
<i>Conferences Organized</i>	: Organized an international conference on Fluid Inclusions (ACROFI-2) (Second Meeting of the Asian Current Research on Fluid Inclusions, Nov 12 – 14, 2008)
<i>Short Courses Organized</i>	: DST, Govt of India sponsored short course on “Fluid Inclusions in Minerals: Methodologies, practice and applications”
<i>Membership in professional bodies</i>	: Member, Society for Geology Applied to Mineral Deposits (SGA); Life Member: SGAT, Life Member, Min. Soc. India; Member, Society of Resource Geology, Japan
<i>Editorial Board</i>	: Member, Advisory Editorial Board of Resource Geology, (Blackwell)
<i>Contribution to Outreach Programs</i>	: Online Course (NPTEL – MOOC) on ‘Mineral Resources : Geology, Exploration, Economics and Environment’ ( <a href="https://www.youtube.com/results?search_query=mineral+resources+iit+kharagpur">https://www.youtube.com/results?search_query=mineral+resources+iit+kharagpur</a> ) : Online course (NPTEL – MOOC) on ‘Fluid Inclusions in Minerals : Principles, Methodology, Practice and Applications’ ( <a href="https://www.youtube.com/watch?v=iqecwuoaFvs&amp;list=PLbRMhDVUMngdq9b2BduR9XwjWsAgflrQa">https://www.youtube.com/watch?v=iqecwuoaFvs&amp;list=PLbRMhDVUMngdq9b2BduR9XwjWsAgflrQa</a> )
<i>Visits Abroad</i>	: Geological Survey of Japan, Deceember, 2007 (two weeks)

## **LIST OF PUBLICATIONS OF M.K.PANIGRAHI**

(Total Scopus Citations : 895; h-index- 16; Google Citations: 1310, h-index 19)

### **RESEARCH PAPERS IN PEER REVIEWED SCI JOURNALS**

1. Behera S., Panigrahi MK and Pradhan A (2019) Gold Favourability Mapping With Stream Sediment Geochemical Data in the Sonakhan Greenstone Belt, Central India: A Combined Concentration Area Fractal and Fuzzy AHP Approach., 107, 45-57
2. Pandit D., Bhattacharya S. and Panigrahi MK (2019) Dissecting through the metallogenic potentials of older granitoids-case studies from Bastar and Eastern Dharwar cratons India. *Geological Society, London, Special Publications* 489, SP489-2019-342
3. Niyogi A, Pati JK, Panigrahi MK, Panda D, Chakarvorty M Parthasarathy, G (2018) Raman, Infrared, and Chemical Characterization of Fly Ash-Generated Spherules. *J. Applied Spectroscopy*, 85, 856 – 863
4. Gupta Abhishek, Dutta Avishek, Sarkar Jayeeta, Panigrahi M. K., Sar Pinaki (2018) Low-Abundance Members of the Firmicutes Facilitate Bioremediation of Soil Impacted by Highly Acidic Mine Drainage From the Malanjkhand Copper Project, India. *Frontiers in Microbiology*, v9
5. Gude Venkatesh, Rout Duttanjali , Panigrahi M.K. Biradha Kumar (2018) Origin of green photoluminescence in four-ring bent-core molecules with ESIPT, selective sensing of zinc ions by turn-on emission and their liquid crystal properties. *Photochemical and Photobiological Sci.*, 17, 1386 - 1395
6. Bhattacharya S, Panigrahi MK (2017) Volatiles associated with granitoid intrusives around orogenic gold deposits in Ramagiri and Penakacherla regions of Eastern Dharwar Craton, South India. *Journal of the Geological Society of India* 90 (5), 569-576
7. Sahoo PK, Tripathy S, Panigrahi MK, Equeenuddin SM (2017) Anthropogenic contamination and risk assessment of heavy metals in stream sediments influenced by acid mine drainage from a northeast coalfield, India. *Bulletin of Engineering Geology and the Environment* 76 (2), 537-552
8. Gupta A, Dutta A, Sarkar J, Paul D, Panigrahi MK, Sar P (2017) Metagenomic exploration of microbial community in mine tailings of Malanjkhand copper project, India. *Genomics data* 12, 11-13
9. Acharya SS, Panigrahi MK (2016) Evaluation of factors controlling the distribution of organic matter and phosphorus in the Eastern Arabian Shelf: A geostatistical reappraisal. *Continental Shelf Research*. 126, 79-88

10. Acharya SS, Panigrahi MK (2016) Eastward shift and maintenance of Arabian Sea oxygen minimum zone: Understanding the paradox. *Deep Sea Research Part-1*, 115, 240-252
11. Acharya SS, Panigrahi MK, Kurian J, Gupta AK and Tripathy S. (2016) Speciation of phosphorus in the continental shelf sediments in the Eastern Arabian Sea. *Cont. Shelf Res.* 115, 65 - 75
12. Acharya SS, Panigrahi MK, Gupta AK and Tripathy S. (2015) Response of trace metal redox proxies in continental shelf environment: the eastern Arabian Sea scenario. *Cont. Shelf Res.* 106, 70-84
13. Bhattacharya S and Panigrahi MK (2015) Source of ore fluid in lode gold deposits of Eastern Dharwar Craton; An intricate issue. *J. of the Ind. Inst. Sci.*, 95, 201-208
14. Arumugm, Yuvaraja; Gupta, Anil K.; Panigrahi, M K (2014) Species diversity variations in Neogene deep-sea benthic foraminifera at ODP Hole 730A, western Arabian Sea. *Jour Earth System Science*, 123, 1671-1680
15. Bhattacharya S and Panigrahi MK (2014) Oxygen isotope ratio of quartz veins from the Ramagiri-Penakacherla schist belts and surrounding granitoids in the Eastern Dharwar Craton: A case for a possible link between gold mineralization and granite magmatism. *Ore Geol Rev*, 63, 201-208
16. Nanda JB, Panigrahi MK and Gupta S (2014) Fluid inclusion studies on the Koraput Alkaline Complex, Eastern Ghats Province, India: Implications for mid-Neoproterozoic granulite facies metamorphism and exhumation. *J. Asian Earth Sci.*, 82, 10-20
17. Sahoo P, Tripathy S., Panigrahi MK and Equeenuddin Sk Md (2014) Geochemical characterization of coal and waste rocks from a high sulfur bearing coalfield, India: Implication for acid and metal generation. *J. Geoch. Expl.*, 145, 135-147
18. Pati JK, Panigrahi MK and Chakraborty M (2014) Granite-hosted molybdenite mineralization from Archean Bundelkhand craton-molybdenite characterization, host rock mineralogy, petrology, and fluid inclusion characteristics of Mo-bearing quartz. *J Earth Sys. Sci.*, 123, 943-958
19. Bhattacharya S and Panigrahi MK and Jayananda M (2014) Mineral thermobarometry and fluid inclusion studies on the Closepet granite, Eastern Dharwar Craton, south

India: Implications to emplacement and evolution of late-stage fluid. *J. Asian Earth Sci.*, 91, 1-18

20. Pandit, Dinesh; Panigrahi, M K.; Moriyama, T. (2014) Constrains from magmatic and hydrothermal epidotes on crystallization of granitic magma and sulfide mineralization in Paleoproterozoic Malanjhand Granitoid, Central India. *CHEMIE DER ERDE-GEOCHEMISTRY* , 74, 715-733
21. Pandit D, Panigrahi MK, Moriyama, T and Ishihara S (2014) A comparative magnetic susceptibility, geochemical and fluid inclusion studies on the Paleoproterozoic Malanjhand and Dongargarh granitoids, Central India and implications to metallogeny. *Mineral. Petrol.*, 108, 663-680
22. Sahoo PK, Panigrahi MK and Tripathy S, Equeenuddin, SM (2013) Inhibition of Acid Mine Drainage from a Pyrite-rich Mining Waste Using Industrial By-products: Role of Neo-formed Phases. *Water Air and Soil Pollution*, 224, 1-11
23. Sahoo, P. K., Tripathy, S., Panigrahi, M. K. Equeenuddin Sk. Md. (2013) Evaluation of the use of an alkali modified fly ash as a potential adsorbent for the removal of metals from acid mine drainage. *Applied Water Science* 3 (3), 567-576
24. Equeenuddin Sk. Md., Tripathy, S., Sahoo, P. K., Panigrahi, M. K. (2013) Metal behavior in sediment associated with acid mine drainage stream: Role of pH *J. Geoch. Explor.* 124, 230-237
25. Panigrahi MK, Pandit D., Naik, RK and Ishihara S (2013) Reconstruction of physicochemical environment of hydrothermal mineralization at Malanjhand copper deposit, central India: Constraints from sulfur isotope ratios in pyrite, molybdenite and chalcopyrite. *Resource Geology*, 63, 110-116
26. Pandit D and Panigrahi MK (2012) Comparative petrogenesis and tectonics of Paleoproterozoic Malanjhand and Dongargarh granitoids, Central India. *J. Asian Earth Sci.*, 50, 14-26
27. Bhattacharya S., Majumder TJ, Rajawat AS, Panigrahi MK and Das PR (2012) Utilization of Hyperion data over Dongargarh, India, for mapping altered/weathered and clay minerals along with field spectral measurements. *Int J Rem Sens.*, 33, 5438-5450
28. Sahoo PK, Tripathy S, Equeenuddin Sk Md, and **Panigrahi MK (2012)** Geochemical characteristics of coal mine discharge vis-a-vis behavior of rare earth elements at Jaintia Hills coalfield, northeastern India *J. Geoch Explor.*, 112, 235-243

29. Dey, RS , Hajra, S, Sahu, RK, ,Raj, CR and **Panigrahi, MK** (2012) A rapid room temperature chemical route for the synthesis of graphene: metal-mediated reduction of graphene oxide. *Chem. Comm.*, 48, 1787-1789
30. Sahoo, P. K., Tripathy, S., Panigrahi, M. K. Equeenuddin Sk. Md. (2012) Mineralogy of Fe-precipitates and their role in metal retention from acid mine drainage. *Mine Water & Environment*, 31, 344-352
31. Bhattacharya S.; **Panigrahi M. K** (2011) Heterogeneity in fluid characteristics in the Ramagiri-Penakacherla sector of the Eastern Dharwar Craton: implications to gold metallogeny . *Russ. Geol. Geophys.*, 52, 1436-1447
32. Equeenuddin Sk. Md.; Tripathy S.; Sahoo P. K and Panigrahi MK (2010) Geochemistry of ochreous precipitates from coal mine drainage in India *Env. Earth Sci.*, 61, 723-731
33. Sahoo, PK, Bhattacharyya, P, Tripathy, S, Equeenuddin, SM and **Panigrahi, MK** (2010) Influence of different forms of acidities on soil microbiological properties and enzyme activities at an acid mine drainage contaminated site *J. Hazard. Mat.*, 197, 966-975
34. Equeenuddin, SM , Tripathy, S , Sahoo, PK and **Panigrahi, MK** (2010) Hydrogeochemical characteristics of acid mine drainage and water pollution at Makum Coalfield, India . *J. Geoch. Explor.*, 105, 75-82
35. **Panigrahi MK**, Naik RK, Pandit D and Misra KC (2008) Reconstruction of the environment of hydrothermal mineralization of copper from mineral chemistry of biotite, chlorite and epidote: A case study from the Mlanjkhand deposit, Central India. *Geoch. J.* 42, 367-392
36. Moriyama T, **Panigrahi MK**, Pandit D and Watanabe Y (2008) Rare earth element enrichment in late-Archean manganese deposits from the Iron Ore Group, Eastern India. *Res. Geol*, 58, 402-413
37. Panigrahi MK and Gupta S (2007) Graphite-bearing fluid inclusions and their significance to late stage exhumation processes: case studies from two disparate terrains in India. *Acta. Petrol. Sinica*, 23 (1): 53-64
38. Gupta S, Sarkar M and **Panigrahi MK** (2007) Disentangling tectonic cycles along a multiply deformed terrane margin: Structural and metamorphic evidence for mid-crustal reworking of the Angul granulite complex, Eastern Ghats Belt, India . *J. Struct Geol.*, 29, 802-818
39. Pal DC, **Panigrahi MK** and Mishra B (2006) Contrasts in the fluid characteristics and evolution in the Sn-bearing and barren pegmatites of the Bastar-Malkangiri Tin Belt : Implications to the genesis of Sn mineralization *J. Asian Earth Sci.*, 28, 306-319

40. S. Ravi Kumar, **Panigrahi M.K.**, S.K. Thakur , K.U. Kainer , M. Chakraborty , B.K. Dhindaw (2006) Characterization of stress in reinforcements in magnesium based squeeze infiltrated cast hybrid composites. *Materials Science & Engg. A*, v 415, 207-212
41. Tripathy S, **Panigrahi MK** and Kundu N (2005) Soil geochemistry of a fluoride contaminated area in the Nayagarh district, Orissa, India: A factor analytical appraisal *J. Environmental Geochem. & Health*, 27, 205-216
42. A Chattopadhyay, N.Bandyopadhyay, A.K.Das, **M.K Panigrahi** (2005) Oxide Scale Characterization of Hot Rolled Coils by Raman Spectroscopy Technique. *Scripta Materiala*, 52, 211-215
43. S. Gupta, **M. K. Panigrahi** and Meenakshi Sarkar(2005) The late-stage evolution of the Angul migmatitic terrain, Eastern Ghats Belt, Orissa: constraints from integrated structural and fluid inclusion studies. (*Indian J. Geology: Prof. A. De Memorial Volume, V.75* (2003), 147-166
44. Mandal Madhuri, Jana Nikhil Ranjan, Kundu Subrata, Ghosh Sujit Kumar, **Panigrahi Mruganka** and Tarasankar Pal (2004) Synthesis of Au<sub>core</sub>-Ag<sub>shell</sub> type bimetallic nanoparticles for single molecule detection in solution by SERS method *Journal of Nanoparticle Research* , 6(1), 53-61
45. **Panigrahi MK**, Bream B., Misra KC, and Naik RK (2004) Age of granitic activity associated with copper-molybdenum mineralization at Malanjkhanda, Central India *Mineralium Deposita* 39, 670-677
46. Varadwaj KSK, **Panigrahi MK** and Ghose J (2004) Effect of Capping and particle size on Raman laser induced degradation of  $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> Nanoparticles. *J. Solid State Chem.* 177, 4286-4292
47. Mandal Madhuri, Kundu Subrata, Ghosh Sujit Kumar, Jana Nikhil Ranjan, **Panigrahi Mruganka K.** and Pal Tarasankar (2004) Sniffing a single molecule through SERS using Au<sub>core</sub>-Ag<sub>shell</sub> bimetallic nanoparticles. *Curr. Sci.*, 86, No.4, 556-559
48. Kundu N., **Panigrahi M.K** Sharma SP. and Tripathy S.(2002) Delineation of fluoride contaminated groundwater zones around a hot spring using resistivity sounding in Nayagarh district of Orissa, India . *Environmental Geology* , 43, 228-235
49. Kundu N., **Panigrahi MK**, Trpathy S Munshi S. Hart BR and Powell MA.,(2001) A geochemical Appraisal of Fluoride contamination of ground water in Nayagarh District, Orissa, India: *Environmental Geology* , 41, 451-460
50. **Panigrahi MK** (2001) Iron and base metal mining in India: An analysis of current trend in production, price and consumption . In: Subbarao KV and Reddy RD (Ed.) *Some aspects of mineral development in India*. Geol. Soc. Of India Sp. Publ. 95-112

51. Mishra B and **Panigrahi MK** (1999) Fluid evolution in the Kolar Gold Field: Evidence from fluid inclusion studies. *Mineralium. Deposita*, 34, 173-181
52. Mishra B., Pal D.C. and **Panigrahi MK**(1999) Fluid evolution in quartz vein-hosted tungsten mineralization in Chhendapathar, Bankura District, West Bengal: Evidence from fluid inclusion study. *Proc. Ind. Acad. Sci. (Earth & Planet. Sci.)*, 108, 23-31
53. Pal DC, **Panigrahi MK** and Mishra B (1998) Fluid inclusion characteristics of tin bearing pegmatites of Malkangiri district, Orissa. *Jour. Geol. Soc. Ind.*,51, 685- 696.
54. **Panigrahi MK** and Mookherjee A(1997) The Malanjkhanda copper(+ molybdenum) deposit, India: Mineralization from a low-temperature ore-fluid of granitoid affiliation. *Mineralium Deposita*, 32, 133-148
55. Mookherjee A and **Panigrahi MK**(1994) Reserve base in relation to crustal abundance of metals: Another look. *J. Geochemical. Exploration.*, 51, 1-9
56. **Panigrahi MK**, Mookherjee A Pantulu GVC and Gopalan K(1993) Granitoids around the Malanjkhanda copper deposit: Types and age relationship. *Proc. Ind.Acad. Sci(Earth Planet. Sci.)*, 102, 399-413
57. **Panigrahi MK** Mishra B and Mookherjee A(1991) Ore mineralogy and fluid inclusion characteristics of different ore-associations from Malanjkhanda copper deposit, MP,India. *J. Geol. Soc. Ind.*, 37,38-56
58. Mishra B and **Panigrahi MK**(1990) Fe-Zn mixing energetics of the Iss phase in the system Cu-Fe-Zn-S. *Contrib. Mineral. Petrol.*, 105,562-568

#### **PUBLICATIONS IN BOOKS/MONOGRAPHS**

1. S. Tripathy, M. K. Panigrahi and N. Kundu : Appraisal of Fluoride Contamination of Groundwater through Multivariate Analysis : A case study , In:Prasad MNV, Sajwan KS and Naidu R (Ed) Trace Elements in the Environment: Biogeochemistry, Biotechnology, and Bioremediation (CRC Press) 2005, Chap 7,
2. Panigrahi MK, Pandit D and Naik RK (2009) Genesis of the early-Proterozoic granitoid affiliated copper-molybdenum mineralization at Malanjkhanda: A review of status. In: Santosh Kumar (Ed) *Magmatism, Tectonism and Mineralization*, New Delhi, Macmillan, pp 265-292

#### **DISCUSSION PAPERS**

1. **Panigrahi MK** Mishra B and Mookherjee A(1992) Reply to comments by Absar A.on the paper 'Ore mineralogy....Malanjkhanda, MP, India' *J. Geol. Soc. Ind.*, 39, 444-446



2. **Panigrahi MK** and Mookherjee A(1998) ‘The Malanjkhanda copper(+molybdenum) deposit, India: .....’ - A reply, *Mineralium Deposita*, 33, 430-432
3. **Panigrahi MK, Bream B, Misra KC and Naik RK (2006)** Reply to discussion on “‘Age of granitic activity associated with copper–molybdenum mineralization at Malanjkhanda, central India” by Holly Stein, Judith Hannah, Aaron Zimmerman, and Richard Markey. *Mineralium Deposita* (in press)

## **CONFERENCE PRESENTATIONS**

### **International:**

1. **Panigrahi MK** Mishra B and Mookherjee A(1988) Ore petrological study of the Proterozoic Cu-Mo mineralization at Malanjkhanda, MP, India with special reference to fluid Inclusion characteristics. Int. Symp. on Metallogeny Related to the Proterozoic Mobile Belts(IGCP), Dec. 8-10, Calcutta
2. Mookherjee Asoke and **Panigrahi M.K** (1994) Reserve base vis-a-vis crustal abundance of metals: A relook. International Conference on Genesis of Ore Deposits (9th IAGOD), Aug. 4 - 8, Beijing.
3. Mishra B and **Panigrahi MK** (1996) Contrasting fluid evolution pattern in the Kolar Gold Field: Evidence from fluid inclusion studies. (Extended Abstract) PACROFI VI, Wisconsin, Madison, May, 1996
4. **Panigrahi MK**, Misra KC, Bream B and Naik RK (2002) Genesis of the Granitoid affiliated copper-molybdenum mineralization at Malanjkhanda, Central India : Facts and problems. (Extended Abstract, 11<sup>th</sup> IAGOD and Geocongress 2002, Windhoek, Namibia, 22 – 26 July)
5. **Panigrahi MK** (2003) Granites and copper mineralization at Malanjkhanda, MP, India : search for a rationale for the genetic linkage. V Hutton Symposium, Toyohashi, 2-6 Sep, 2003
6. **Panigrahi MK** and Gupta S. (2006) Graphite-bearing fluid inclusions and their implications to late-stage exhumation processes: case study from two disparate terrains in India. (Accepted for oral presentation at ACROFI-I, Nanjing University, China, 26-28 May, 2006)
7. **Panigrahi MK** (2006) A visual C++ - MFC based application software for fluid inclusion data analysis and presentation. (Accepted for poster presentation at ACROFI-I, Nanjing University, China, 26-28 May, 2006)
8. Pandit Dinesh and **Panigrahi MK (2008)** Microtextural study of the Malanjkhanda quartz reef: Implications to post-depositional deformation In: International Conference on Tectonics of the Indian Subcontinent (TOIS), IIT Bombay, March 3-6, 2008. International Association for Gondwana Research Conference Series 5, p. 138.

9. Gupta, S. and Panigrahi, M. K. (2008). **The southern Rengali Province – a reworked or exotic terrane?** International Conference on Geology – Indian scenario and global context, Indian Statistical Institute, Kolkata, January 7-11, Program and Abstracts, p. 42.
10. Dutta, A., Gupta, S. and Panigrahi, M. K. (2008). Stratigraphy, structure and metamorphism of the Rengali Province – implications for the tectonics of the Eastern Indian Shield. International Conference on Tectonics of the Indian Subcontinent (TOIS), IIT Bombay, March 3-6, 2008. International Association for Gondwana Research Conference Series 5, p. 159.
11. Pandit D., Panigrahi MK, Naik R.K. (2008) Fluid characteristics in the leucogranite phase of the Malanjkhanda Granitoid Complex: implications to copper-molybdenum mineralization. Proceedings of ACROFI-2 (Second meeting of the Asian Current Research on Fluid Inclusions), IIT, Kharagpur, Nov 12-14, 2008, pp 144 – 146
12. Panigrahi MK, Pandit D, Moriyama T and Ishihara S (2009) Paleoproterozoic granite-ore system in the perspective of crustal evolution: Insights from the Malanjkhanda copper deposit and surrounding granitoids in the Central India Craton. Proc of the Tenth Biennial meeting of SGA, pp 957-959
13. Panigrahi MK and Bhattacharya S (2010) Heterogeneity in fluid characteristics in the granite-greenstone ensemble of the Eastern Dharwar craton: A synoptic overview. Proc. ACROFI-3 and TBG XIV, 15-20 Sep, 2010, Novosibirsk, Russia, pp 162-63
14. Panigrahi MK and Acharya SS (2010) A Microsoft Excel 2007 and MS Visual Basic Macro based software package for computation of density and isochors of fluid inclusions. Proc. ACROFI-3 and TBG XIV, 15-20 Sep, 2010, Novosibirsk, Russia, pp 160-61
15. Bhattacharya S., Panigrahi MK and Jayananda M (2011) Fluid inclusion characteristics in parts of Closepet granite, south India. In: Proceedings, International Symposium on Precambrian Accretionary Orogens. New Delhi, pp 8-10
16. Bhattacharya S., Panigrahi MK (2012) Fluid regime in the Ramagiri-Penakacherla granite greenstone ensemble of Eastern Dharwar Craton: Implications for gold metallogeny. In: 4<sup>th</sup> Biennial conference on Asian Current Research on Fluid Inclusions (ACROFI-IV), Brisbane, Australia, pp 7-8
17. Bhattacharya S., Panigrahi MK (2014) Fluid stratification in the Dharwar crust: insights from Closepet granite. In; Proceedings of the Vth Asian Current Research on Fluid Inclusions (ACROFI-V), Xian, China
18. Rout D., Panigrahi MK and Pati JK (2016) Origin and evolution of giant quartz reefs in the Bundelkhand craton, India: Constraints from Fluid Inclusion study. Proc. VI ACROFI (Asian Current Research on Fluid Inclusions), 2016, (Abstract Volume, pp 72-75).

19. Rout D., Panigrahi MK and Pati JK (2017) Fluid characteristics in the giant quartz reef system of the Bundelkhand craton, India: Constraints from fluid inclusion study. (Abstracts) AGU Fall Meeting, New Orleans

### **National**

1. Rao KS **Panigrahi MK** Das RP Mishra B Ray HS Mukunda PG and Mookherjee A(1989) Use of mineralogical studies during ammonia leaching of multimetal sulfides. ATM abstracts, 27th AMD and 43rd ATM, 14-17 Nov, Calcutta
2. Rao KS Das RP **Panigrahi MK** Mishra B Ray HS Mukunda PG and Mookherjee A(1989) Mineralogical studies on roasting reactions of multimetal sulfides. Ibid.
3. **Panigrahi MK** (2001) Iron and base metal mining in India: An analysis of current trend in production, price and consumption. *National Sem. On Mineral Based Industries : Present Status and Future Prospects, Visakhapatnam, 5-7 Dec., 2001*
4. Pati Jayanta K. and **Panigrahi Mruganka K.** (2005) Molybdenite-bearing granitoids from Bundelkhand Craton and the nature of mineralizing fluid. In: Proterozoic System of India: Evolution and Economic Potentials. (Abstract Volume) ISM Dhanbad, Nov. 11-12, 2005
5. Pandit D and Panigrahi MK (2007) Emplacement mechanism of the Malanjkhhand granite: constraints from bulk and mineral chemistry: In Himalayan Geology, v28, Abstract Volume on Collision Zones and Geodynamic Workshop, Sep 20-21, 2007
6. Panigrahi MK (2007) Genesis of the granitoid affiliated Paleoproterozoic copper-molybdenum mineralization at Malanjkhhand: A review of status. (presented at the National Seminar on Magmatism, Tectonism and Mineralization at Kumaon University, Nainital , 29-31 Oct. 2007)
7. Bhattacharya S., Panigrahi MK(2014) Physicochemical characterization of Archean granitic hydrothermal systems vis-à-vis lode goldmineralization: insights from Eastern Dharwar craton, south India. In: International Seminar on Magmatism, Tectonism and Mineralization (MTM-2014), Nainital, India, pp 98-99.

### **MISCELLANEOUS**

1. **Panigrahi MK**(1994) Fluid inclusions in minerals : In Mookherjee A (Ed.) A profile of Geoscience Research in India - A status Report. Diamond Jubilee Publication of INSA, New Delhi, INSA, pp 42-45
2. **Panigrahi M.K.**(2000) Thermodynamics of aqueous electrolytes: Implications to hydrothermal ore forming environments: (Lecture Note) In: DST Sponsored Contact Programme on

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