

**SHIVAKUMAR I. ANGADI , PhD**

Scientist

Mineral Processing Department

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**EDUCATIONAL QUALIFICATION**

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Indian School of Mines, Dhanbad, Jharkhand, India

**Ph.D. in Mineral Engineering****2007**

Research Topic: "Conventional and Column Flotation Studies on Coal and Graphite Fines"

Karnatak University, Dharwad, Karnataka, India

**M.Tech in Mineral Processing****2000**

Thesis: "Reduction of silica from silicious manganese ore of Chiknayakanhalli area, Tumkur Dist., Karnataka"

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**AWARDS**

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- Doctoral Fellowship, Indian School of Mines, Dhanbad, India **2001 – 2004**
- Post Doctoral Fellowship, Korea Institute of Geosciences and Mineral Resources (KIGAM), South Korea **April 2011 - March 2012**

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**PROFESSIONAL EXPERIENCE**

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CSIR-Institute of Minerals and Materials Technology, Bhubaneswar, India

**Scientist****Sept.07 - till date**

Tega Industries Limited, Kolkata, India

**Senior Technical Officer****Jul. 06 – Aug.07****Technical Officer****Feb. 05 – Jun. 06**

Indian School of Mines, Dhanbad, Jharkhand, India

**JRF/SRF****Jun. 01 – Jan. 05**

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**RELATED EXPERIENCE**

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Shivakumar Angadi is having research as well as industrial experience. His PhD thesis was on "Conventional and column flotation studies on graphite and coal fines". This research work involve studies on interaction between solids, liquid and air phases in the flotation machines, which has helped in analyzing the mechanism of transportation of solids and water to the froth products.

Later, Dr. Angadi was associated with Mineral Processing SBU, Tega Industries Ltd., Kolkata, wherein, he got exposed to industrial practices [about two and half years]. He was in-charge of mineral processing laboratory and was responsible for technical inputs to the commercial offers. He was also assigned responsibilities like selection of hydrocyclones, flowsheet development, plant commissioning, conducting plant level test works, improvement of the laboratory facilities etc. During his tenure in Tega Industries many plant commissioning/test works were carried out successfully.

Presently, Dr. Angadi is working on process development for the beneficiation of low-grade ores, slimes, and waste generated during mining/mineral processing activities. The studies are oriented towards coarse size beneficiation using jigs and slimes beneficiation using advance gravity separators, magnetic separators, flotation etc. He is involved in teaching of unit operations to M.Tech and Post-Graduation Diploma in Mineral Engineering (PGDME) students of the Institute and supervising their project works.

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## SUPERVISION OF PROJECT WORK

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### At Present

- Supervision of PhD Thesis:  
Mr. Dinesh Kumar Biswal, Sr. Manager, Allminerals Asia Pvt. Ltd., Kolkata, India has registered for PhD under SOA University, Bhubaneswar, India on the topic "Beneficiation Studies on Indian Iron Ores Using Jigs"
- Supervision of PGDME Thesis:  

<u>Name of the Student</u>	<u>Project Title</u>
Mr Abhishek Mohanty	Beneficiation studies on low-grade iron ore fines
Mr Imkong Rathi	Efficiency evaluation of gravity concentration units treating low-grade iron ores

### Completed

- Supervision of PGDME (2009-2010 batch) Thesis:  

<u>Name of the Student</u>	<u>Project Title</u>
Mr Arabinda Behera	Beneficiation and optimization studies of low-grade iron ore fines
Ms Aruna Mohanty	Magnetic Separation Studies on Low-grade Iron Ore Fines
Mr Nitesh Singh	Classification of Coal Fines (-0.5 mm) Using Hydrocyclone
Mr Subhansu Sekhar Sahoo	Studies on Validity of Models to Small Diameter (1, 2 and 5inch) Hydrocyclones
- Supervision of Summer Internship projects (May – June 2009):  

<u>Name of the Student</u>	<u>Degree/Institute</u>	<u>Project Title</u>
Mr Rachit Tiwary	3 <sup>rd</sup> Year B.Tech in Mineral Engineering	Effect of slurry properties on hydrocyclone classification
Mr Piyush Kumar Raghav	Indian School of Mines, Dhanbad	Validity of Models to Small Diameter (50mm) Hydrocycl under Variable Operating Conditions

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## PUBLICATIONS

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### Publications in International Peer-reviewed Journals

1. **S.I. Angadi**, Ho-Seok Jeon and S. Nikkam, 'Experimental analysis of solids and water flow to the coal flotation froths', International Journal of Mineral Processing, 110-111 (2012) 62–70.
  2. **S. I. Angadi**, Ho-Seok Jeon, A. Mohanthy, S. Prakash and B. Das, 'Analysis of Wet High-Intensity Magnetic Separation of Low-Grade Indian Iron Ore using Statistical Technique', Separation Science and Technology, 47 (2012) 1129–1138.
  3. C. Eswaraiah, **S.I. Angadi**, B.K. Mishra, 'Mechanism of particle separation and analysis of fish-hook phenomenon in a circulating air classifier', Powder Technology, 218 (2012) 57–63.
  4. D.S.Rao, **S.I. Angadi** and S.K.Das, 'Electron microscopic studies of ferrochrome industry flue dust and their implications on possible re-use, World of Metallurgy – ERZMETALL, 65/6 (2012) 68-374.
  5. **S. I. Angadi**, D. S. Rao, A. R. Prasad and R. B. Rao, "Recovery of ferrochrome values from flue dust generated in ferroalloy production – a case study" Mineral Processing and Extractive Metallurgy (Trans. Inst. Min Metall. C), 120/1 (2011) 61-63.
  6. B. Das, B.K. Mishra, S. Prakash, S.K. Das, P.S.R. Reddy, and **S.I. Angadi**, "Magnetic and flotation studies of banded hematite quartzite (BHQ) ore for the production of pellet grade concentrate" International Journal of Minerals, Metallurgy and Materials, 17/6 (2010) 675-682.
  7. D. S. Rao, T V Vijayakumar, **S I Angadi**, S Prabhakar and G B Raju, " Effects of modulus and dosage of sodium silicate on limestone flotation" Maejo International Journal of Science and Technology, 4/3 (2010) 397-404.
  8. D. S. Rao, **S I Angadi**, S Muduli, B D Nayak, "Recovery of chromite values from ferrochrome industry flue dust" AT Mineral Processing, 51/12 (2010) 56-63.
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9. B. Das, B.K.Mishra, **S. I. Angadi**, S. K. Pradhan, S. Prakash, J.K.Mohanty, "Characterization and recovery of copper values from discarded slag", Waste Management & Research 28 (2010) 561-567.
  10. **S. I. Angadi** and N. Suresh, "A Kinetic Model for the Prediction of Water Reporting to the Froth Products in Batch Flotation", Mineral Processing and Extractive Metallurgy (Trans. Inst. Min. Metall. C), 114 (2005) 225-232.

#### Publications in National Peer-reviewed Journals

1. R. Swain, **S. I. Angadi**, S. K. Singh and R. Bhima Rao, "Characterisation of Mullites Prepared from Kaolin Clay and Partially Laterised Khondalite Rocks" Metals Materials and Processes, 20/3 (2008) 241 - 248.
2. **S. I. Angadi** and N. Suresh "Kinetics and Entrainment Studies in Batch Coal Flotation" in the Journal of the Institution of Engineers (India), 85 (2004) 1-4.
3. **S. I. Angadi**, S. C. Puranik and Bhima Rao, "Preliminary Investigations on Recovery of Manganese from a Low Grade Siliceous Manganese Ore", in The Indian Mining & Engineering Journal, 5/5 (2002) 30-32.

#### Presentations in Seminars & Symposiums

1. **S. I. Angadi**, Ho-Seok Jeon and B.K.Mishra, 'An overview of hydrocyclone circuit selection and optimization', presented at ICRA Asian Workshop Kangwon National University, Korea held from 15-16 Dec. 2011.
  2. Ho-Seok Jeon, Jeong-Il Yang, **S. I. Angadi** and Sang-Ho Baek, 'Development of separation process for Dong-Bo mine scheelite ore' presented at the International Seminar on Mineral Processing Technology (MPT-2011) held at Udaipur, India from 20-22 October, 2011.
  3. Ho-Seok Jeon, **S. I. Angadi** and Sang-Ho Baek, 'Efficiency evaluation of gravity jigs treating cassiterite ore' presented at the International Seminar on Mineral Processing Technology (MPT-2011) held at Udaipur, India from 20-22 October, 2011.
  4. Sang-Ho Baek, Ho-Seok Jeon, **S. I. Angadi** and Byoung-Gon Kim, 'Molybdenite flotation studies to recover the concentrate suitable for lubricant use', presented at the International Seminar on Mineral Processing Technology (MPT-2011) held at Udaipur, India from 20-22 October, 2011.
  5. Ho-Seok Jeon, **S. I. Angadi** and Sang-Ho Baek, 'Pre-concentration of Ul-jin Cassiterite Ore by a Knelson concentrator' presented at the International Seminar held at Kangawon National University, South Korea from 21-22 September, 2011.
  6. **S. I. Angadi**, S. Prakash, B. Das, P. S. R. Reddy and B. K. Mishra, 'Analysis of Interaction Effects in Phosphate Ore Flotation' presented in MPT-2009 held at IMMT, Bhubaneswar from 28-30 October 2009.
  7. B. Das, S. Prakash, **S. I. Anagdi**, J. K. Mohanty, P. S. R. Reddy and B. K. Mishra, 'Studies on beneficiation of low-grade lime stone for use in cement industry', presented in MPT-2009 held at IMMT, Bhubaneswar from 28-30 October 2009.
  8. B. Das, B. K. Mishra, **S. I. Anagdi**, S. Prakash, and P. S. R. Reddy, 'Beneficiation of banded hematite quartzite (BHQ) ore by flotation', presented in MPT-2009 held at IMMT, Bhubaneswar from 28-30 October 2009.
  9. **S. I. Angadi**, Nagraj C. H. M. and A. Bandyopadhyay, "Future Lies in Low Grade Iron Ore Beneficiation", presented at the conference "Marketing of Indian Iron Ore" organised by FIMI at Hotel Cidade-de-Goa, Goa from 23-24 August 2007.
  10. **S. I. Angadi**, S Mondal, N Suresh and R Venugopal, "Textural Image Analysis of Flotation Froths Using Neural Nets: A Case Study" presented at the International Seminar on Mineral Processing Technology (MPT-2005) held at Indian School of Mines, Dhanbad, India from 6-8 January, 2005.
  11. **S. I. Angadi** and N Suresh, "Physical Separation Methods in Mineral Processing", presented in the National Seminar on Emerging Trends in Applied Physics held at Indian School of Mines, Dhanbad from 21-23, February 2004.
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**Following projects are handled independently and worked as a team member during September 2007 to till date. The total projects cost is about 600,000 USD.**

**I. Projects Handled.**

1. 'Laboratory investigations on beneficiation of low-grade siliceous phosphate ore' sponsored by Coromandal Fertilizers Ltd., Secunderabad
2. 'Jigging studies on iron ore fines' sponsored by Allminerals Asia Ltd., Kolkata
3. 'Characterization and beneficiation studies of slag samples to recover copper values (Part-II)' sponsored by Hindalco Industries Ltd., Gujarat
4. 'Feasibility Studies on Beneficiation of Iron Ore Tailings' sponsored by TIMBLO Industries Ltd., Goa

**II. Contribution as a Project Team Member**

1. 'Characterisation and Beneficiation Studies for Recovery of Copper Values from Copper Slag' sponsored by Hindalco Industries Ltd., Gujarat
2. 'Development of Integrated Flowsheet for Complete Utilisation of Low-grade Iron Ore' sponsored by Jindal Steel & Power Ltd., Barbil
3. 'Beneficiation Studies of Low-grade Limestone Samples from Birla Cement Corporation' sponsored by Birla Cement Ltd., Rajasthan
4. 'Development of process flow sheet to beneficiate low grade graphite to produce high grade concentrate' sponsored by Orissa Manganese & Minerals Pvt. Ltd.
5. 'Development of beneficiation scheme to recover iron values from siliceous iron formation' sponsored by Matrix Metallics Pvt. Ltd., Mumbai
6. Beneficiation and pelletization studies of low grade iron ore fines' sponsored by Yazdani International Pvt. Ltd., Bhubaneswar
7. 'Development of flow sheet to beneficiate low grade iron ores and production of concentrate for palletization studies' sponsored by Usha Martin Ltd., Jamshedpur
8. 'Beneficiation of iron ore fines to produce concentrate for iron making' sponsored by Jagannathpur Steel Ltd., Ranchi
9. 'Beneficiation of low grade iron ore fines for finex process of iron and steel making' sponsored by Mid East Steel
10. 'Development of integrated flow sheet for complete utilization of low grade iron ore' sponsored by Rungta Mines Ltd., Barbil
11. 'Beneficiation of low grade iron ore fines for sintering and pelletisation' sponsored by Bhushan Power and Steel Ltd
12. 'Beneficiation studies of low grade limestone from Ambuja Cements Ltd.' sponsored by Ambuja Cements Ltd., Maharastra
13. 'Pelletization studies on blue dust and in combination with iron ore fine concentrate' sponsored by Yazdani Int. (P) Ltd., Bhubaneswar
14. 'Beneficiation of low grade iron ore fines by jigging' sponsored by M/s. Rungta Mines Ltd., Barbil
15. 'Beneficiation studies on low grade limestone from polished stone mines' sponsored by Associated Stone Industries Ltd., Kota
16. 'Manganese ore exploitation, exploration, characterization and beneficiation studies of low grade ore from OMM

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17. 'Beneficiation of low grade iron ore fines by high gradient magnetic separator' sponsored by National Mineral Development Corporation (NMDC), Hyderabad.
  18. 'Characterisation and beneficiation of low grade iron ore of MEL to produce quality concentrate' sponsored by Mineral Enterprises Ltd., Bangalore.
  19. 'Process development to reduce iron from bauxite for preparation of calcined bauxite' sponsored by M/s. Gokul Minex, Ahmedabad
  20. 'Beneficiation studies of lean grade limestone for removal of silica' sponsored by Rajashree Cements, Karnataka
  21. 'Characterisation and beneficiation of low grade manganese ore from OMC lease hold area for its optimum utilization' sponsored by Odisha Mining Corporation, Odisha
  22. 'Studies to improve the chrome iron ratio of chromite concentrates of COB plant and recovery of chromite values lost in the plant tailings' sponsored by FACOR, Kaliapani
  23. 'Beneficiation studies of BHQ ore by magnetic separation techniques to prepare pellet grade concentrate' sponsored by MSPL, Hospet
  24. 'Beneficiation studies of low grade iron ore fines for pelletisation' sponsored by Orissa Minerals Development Company Limited (OMDC), Kolkata
  25. 'Characterisation and beneficiation studies of bauxite ores for reduction of reactive silica and iron' sponsored by Vedanta Aluminium Ltd., Lanjigarh
  26. 'Assistance in commissioning and performance evaluation of manganese ore beneficiation plant' sponsored by Sandur Manganese & Iron Ore Ltd. Bangalore
  27. 'Development of Simulation Model for Jigging Process' sponsored by SAIL (RDCSI), Ranchi
  28. 'Improvement in sinter productivity through deep beneficiation and agglomeration technologies for rational utilization of low grade iron ores and fine' sponsored by Ministry of Steel, New Delhi
  29. 'Development of advanced eco-friendly energy efficient processes for utilisation of iron ore resources of India' sponsored by CSIR, New Delhi
  30. 'Development of technology to produce clean coal from high ash and high sulphur Indian coal' sponsored by Ministry of Steel, New Delhi

### **III. PGDME Program Coordinator**

CSIR-IMMT, Bhubaneswar is offering one-year Post-Graduation Diploma in Mineral Engineering (PGDME). Presently, Dr Angadi is the program coordinator and details of the program can be reached via <http://www.immt.res.in/academic/default.htm>

### **IV. Miscellaneous Activities**

- Member of the organizing committee of many professional events held at CSIR-IMMT, Bhubaneswar
- Member of Organizing Committee, IMPC-2012
- Facility creation - addition of new equipments to the laboratory.

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### **MEMBERSHIP OF PROFESSIONAL BODIES**

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- Life member of Indian Institute of Mineral Engineers (IIME), Jamshedpur
- Secretary, IIME, Bhubaneswar Chapter

Bhubaneswar

(Dr. SHIVAKUMAR ANGADI)