BIO DATA OF PROF. DR. P.K. JENA

1.	NAME	Prof. Dr. Prafulla Kumar Jena
2.	PRESENT POSITION & ADDRESS	Chairman, Institute of Advance Technology & Environmental Studies (IATES), & President, Natural Resources Development Foundation Plot No. 80A-83A, Lewis Road, Bhubaneswar – 751 002, INDIA Ph. No. 91-674 2430243, 2430363 Fax No. 91-674 2430243 Email: prof.pkjena_iates@yahoo.com iatesbbsr@gmail.com
3.	POSITIONS HELD	Senior Visiting Professor Research Centre for New Materials Resources, Tohoku University, Sendai 980, JAPAN. Senior Visiting Professor Department of Materials Science and Metallurgy, Rio de Janeiro Catholic University, Rio de Janeiro, RJ, BRAZIL. Distinguished Professor of the TATA CHAIR Department of Metallurgical Engineering, Indian Institute of Technology Kharagpur – 721 302, INDIA. Director General Council of Scientific & Industrial Research (CSIR) Rafi Marg, New Delhi – 110 001 Director, Regional Research Laboratory (RRL), (CSIR) Bhubaneswar – 751 013, INDIA Professor of Metallurgical Engineering, Banaras Hindu University, Vanarasi – 221 005, INDIA.

Senior Scientist, Metallurgy Division,
Bhabha Atomic Research Centre,
Trombay, Mumbai 400 085, INDIA

4. DATE OF BIRTH : 27th December, 1931

5. ACADEMIC QUALIFICATIONS B.Sc.(Honours) (Utkal)
M.Sc. (Chemistry) (Utkal)
Ph. D. (Physical Chemistry) (Utkal)
M.S. (Metallurgical Engineering) (British Columbia)

6. AREA OF SPECIALISATION Mineral Processing, Extractive Metallurgy, Development of Special Materials & Composites, Industrial Waste Management and Environmental Studies

7. ACHIVEMENTS TOWARDS RESOURCES CONSERVATION AND ENVIRONMENTAL MANAGEMENT

Please see Appendix – I

8. **SOME OF THE MAJOR HONOURS AND AWARDS**

(a) National Metallurgist Award (1969)

(b) PADMASHREE from Government of India for outstanding contributions to Education and Research (1977)

(c) Federation of Indian Chamber of Commerce and Industries Award (1982)

(d) President, Engineering Section, Indian Science Congress (1988)

(e) First Distinguished Professor of TATA Chair, IIT, Kharagpur, India (1990)

(f) Dr. Daya Swarup Memorial Lecturer, Indian Institute of Metals (1991)

(g) Institution of Engineers (India) Award for Distinguished and Meritorious services and dedicated contribution to the society in 1998.

(h) Senior Scientist Award of 1999, Orissa Bigyan Academy, Bhubaneswar

(i) Life time Achievement in Chemistry from Ravenshaw Chemistry Alumni Association, Ravenshaw University in 2008

(j) Distinguish Services Award 2008, Department of Metallurgical Engineering, Banaras Hindu University.

(k) Think Odisha Leadership Award 2010 in the area of Environment Management, Times of India Group.

(l) Life Time Achievement Award of Excellence in 2011, Institute of Minerals & Materials Technology, CSIR, Govt. of India

(m) Life Time Achievement Award for Outstanding Contribution in the field of Scientific Research (Rajiv Gandhi Professional Award – 2012) by Rajiv Gandhi Forum, Odisha State.

(n) Distinguished Scientist Award 2012 for Outstanding Contribution in the field of Science & Technology by Bengal Engineering and Science University, Shibpur, in association with Millennium Institute.

9. NUMBER OF RESEARCH PUBLICATIONS AND PATENTS

Research Papers : 240
Patents : 55

10. FELLOWSHIP AND MEMBERSHIP

(a) Life Fellow of the Indian Academy of Sciences
(b) Life Fellow of the Institution of Engineers, India
(c) Life Fellow of the Indian Institute of Metals
(d) Life Member of Indian Science Congress
(e) Ex-Member of the Planning Board of Orissa
(f) Ex-President of Orissa Vigyan Academy.
(g) Associated with many research, educational and industrial organizations as member of various Committees and Boards.

11. OTHER RESEARCH AND EDUCATIONAL ACHIEVEMENTS

Instrumental in setting up Institute of Physics, Planetarium and Science Centre at Bhubaneswar.

First Chairman of the Planetarium, Bhubaneswar

First Chairman of the Science Centre, Bhubaneswar

Founder President of Natural Resources Development Foundation (NRDF), Bhubaneswar

Founder Chairman of the Institute of Advance Technology & Environmental Studies (IATES), Bhubaneswar.

Founder Editor - in - Chief of the Quarterly Journal entitled Journal of Sustainable Planet, Bhubaneswar.

Appendix – I

SOME MAJOR ACHIEVEMENTS OF PROF. DR. P. K. JENA

Prof. Dr. P. K. Jena is a scientist and educationalist of International repute. For more than fifty years he has been carrying out research and developmental programmes in the areas of natural resource conservation and development and environment management. Dr. Jena has made exemplary contributions towards mineral resource conservation and development and some of his processes have been commercialized. Prof Jena has built a national laboratory under CSIR at Bhubaneswar as its Director and also groomed a number of research groups namely at Bhabha Atomic Research Centre as Senior Scientist, Metallurgical Engineering Department at Banaras Hindu University as Professor and IIT Kharagpur as First Distinguished Professor of TATA CHAIR. Prof Jena has served as an active member in a number of important committees in industrial, research and educational sectors. In order to promote activities towards natural resource conservation & development and environment management, he has established a Natural Resource Development Foundation (a Registered Society) and Institute of Advance Technology & Environmental Studies (a Registered Trust) and is engaged in guiding various developmental and research activities in these two organizations. Since September 2010 Prof. Jena has started publishing a quarterly Journal entitled "Journal of Sustainable Planet".

Some of the major contributions of Dr. Jena are summarized below:

1. Conservation and Development of Mineral Resources

Prof. P. K. Jena has devoted more than 50 years in conducting and guiding R & D projects related to conservation and development of mineral resources. Minerals are very precious and one of the most important natural resources for industrial and socio-economic development of mankind. These being non-replenishable in nature have to be

conserved and judiciously utilized. Dr. Jena has carried out extensive studies on upgrading low and complex ores and minerals, extraction of metal values from lean and complex ores and recovery of values from industrial wastes and by products. Some of the pioneering work carried out by Prof. Jena includes beneficiation of low grade iron and manganese ores and bauxite, recovery of iron values from tailings and coal fines from washery slimes. He has been the pioneer in the country for developing processes for extraction of refractory metals like Niobium, Tantalum, Vanadium, Tungsten and Molybdenum through metallo thermic process. Some of these have been commercialized in India. In order to utilize the waste ore fines, he has developed processes for agglomeration of these and some of the commercialized processes include briquetting of chromite fines and pan sintering of iron ore and manganese ore fines. Some of the outstanding R & D projects carried out by him include Chloride Metallurgy of non ferrous ores and minerals, extraction of nickel and cobalt from lateritic over burden of chromite mines, extraction of copper, lead and zinc from off grade complex sulphide ores, extraction of vanadium from titaniferrous magnetite, extraction of copper, nickel, cobalt and manganese from poly metallic Indian ocean nodule, and preparation of nano alloys of nickel-copper and their composites with alumina. The technology developed by him for low temperature chlorination of refractory metal oxides by carbon tetra chloride is highly acclaimed. .

Prof. Jena has also done pioneering work in treating the wastes of mining and metallurgical industries and recovering the values. During mineral processing, metal extraction and fabrication, considerable amount of metal values are lost in the tailings, flue dust, slags, residues, drosses, turnings etc., causing a lot of environmental pollution to air, water and land. Under his leadership, a number of processes have been developed to recover the metal values from such wastes while minimizing the pollution problems. Some of the important processes developed are given below:

(a) Recovery of copper, nickel and cobalt values from Indian copper converter and smelter slags,
(b) Extraction of nickel and cobalt from the overburdens of chromite mines,
(c) Treatment of pickle liquors of the steel plant to recover high pure iron,
(d) Development of cheap and attractive processes for sintering of ore fines of iron, manganese and chromium using low grade fuels.

(e) Briquetting of beneficiated chromite fines for producing ferro chrome.

(f) Recovery of values from washery slimes and beneficiation tailings.

(g) Utilization of polluting flyash of coal fired thermal power plants for making insulation and refractory bricks,

(h) Recovery of high pure manganese dioxide from ferro manganese slag,

(i) Recovery of zinc from 'moore cake' residue of the zinc plant,

(j) Recovery of manganese from low grade manganese ore by leaching with waste ferrous sulphate.

(k) Recovery of metal values from low grade complex sulphide concentrates of copper, lead and zinc through low temperature aqueous chlorination.

(l) Recovery of refractory metals like Nb, Ta, Zr, Ti and Sn from Tin slag

2. Promoting a world class National Laboratory in India

Prof. P. K. Jena has built the Regional Research Laboratory at Bhubaneswar, a national laboratory (presently named as Institute of Minerals & Materials Technology) under the Council of Scientific & Industrial Research (CSIR), India, to a research institution of international standing as its Director for about eighteen years. Under Dr. Jena's leadership, excellent infrastructural facilities were developed and R & D work were carried out in the areas of conservation and development of mineral resources, processing of the industrial wastes to recover values and protecting the environment, development of special materials, design & development of furnaces and equipments, development of forest and marine resources, integrated development of mines and commercialization of plantation of medicinal and aromatic plants. The laboratory's pilot plant facilities in the areas of mineral processing and metal extraction are unique in the country and at present are being utilized for various pilot plant studies.

3 . Establishment of Research Facilities at other Scientific & Academic Institutions:

(a) Dr. Jena after his higher studies and research at the University of British Columbia, Canada, worked in the Atomic Energy Establishment, Mumbai, India, as a Senior Scientist in the area of Metallurgical Engineering from the year 1959

to 1967. During this period, he established a high class research group in Extractive Metallurgy of Refractory Metals. He has made pioneering contributions in development of processes for extraction and purification of refractory metals like Niobium, Tantalum, Vanadium, Tungsten and Molybdenum. Some of his processes have been commercialized.

(b) Dr. Jena worked as Professor of Metallurgical Engineering at Banaras Hindu University, Varanasi from 1968 to 1972. During this period, he established a high class research group in Process Metallurgy. His work on production of sponge iron in low shaft furnace using non-coking coal and production of some non ferrous metals through oxide-sulphide reactions were highly acclaimed in India and abroad.

(c) Prof. Jena worked at Rio de Janeiro Catholic University, Brazil as a Senior Visiting Professor during 1992 to 2003 and established research groups in Chloride Metallurgy and Nano Composites. He contributed extensively towards establishing the mechanisms for Chlorine and Carbon Tetra Chloride Chlorination of Refractory Metal Oxides. In the Nano Composite area, he very successfully guided a number of research programmes and developed metal-metal oxide nano composites like Cu-Al_2O_3, Ni-Al_2O_3, Cu-Ni-Al_2O_3, and the Cu-Ni Nano alloy.

4. Integrated Development of Mines & Mine Areas:-

Prof. Jena is the author of a novel integrated mine area development and habitat programme which is named as **MAHA** (Mines-Metals And Habitat). The MAHA Project was executed under his leadership at a chromite mine in Sukinda, Orissa and the other at a limestone mine in Lambidhar, Mussorie, Uttarkhand, both in India. The main objectives of the project were (a) adopting better technology for mining and mine safety, (b) recovery and utilization of off-grade ores and the ore fines, (c) use of the overburdens for construction of mine area roads and houses, (d) use of mine water for domestic, pisciculture and agricultural purposes, (e) Rain water harvesting (f) plantation of commercial trees on the overburdens and (g) undertaking other pollution control measures to maintain the ecology of the region. These activities in the above two mines were demonstrated with a great

deal of success involving experts in some of the national laboratories under CSIR, India.

5. Greening Mine area and Tapping Water from Mine Pits while Mining the Valuable Minerals :

Ecological conservation and processing of mining and metallurgical wastes being his speciality, Dr. Jena's services was sought by the Delhi State (India) Mineral Development Corporation for integrated development of Bhatti and Gujriwala mines situated at the Delhi- Hariyana States border. Prof. Jena, after extensive visit of the mine sites and holding detail discussions with the concerned officials, gave a report for various developmental programmes including exploitation of the water resources and plantation in the mine areas.

6. Establishment of the Natural Resources Development Foundation (NRDF)

The NRDF, an autonomous registered society, has been established in 1988 at Bhuaneswar by Dr. Jena as its founder President. During these years, the Foundation has undertaken a number of programmes for bringing awareness about various natural resources and suggesting ways and means to develop and conserve these.

A few years back, a programme sponsored by the National Book Trust, India, for publication of books on various natural resources for the neo-literates, was undertaken under the leadership of Dr. Jena. In this programme, nine books have been published on various natural resources for the awareness of common man. .

7. Established the Institute of Advance Technology & Environmental Studies (IATES)

In 1999, the IATES has been established by Prof. Jena as a charitable Trust under his Chairmanship at Bhubaneswar, India, to offer technical services to various industries and further research and special training in the areas of Environmental Studies, conservation and development of Mineral resources,

management of industrial wastes, Water resource management & Rain water harvesting, afforestation in mine areas and waste lands and development of special materials.

In recognition of the excellent facilities and expertise available and the achievements, the Institute has been recognized by the Department of Scientific & Industrial Research (DSIR), Govt. of India. The Institute is also recognized by the Utkal University, Bhubaneswar, Odisha as a Research Centre for Doctoral Degree in Environmental Science.

8. Organized Symposia / Conferences for Facilitating Exchange of Knowledge and New Ideas in the Areas of Mineral Conservation, Industrial Waste Utilization, Water resource Development and Environmental Management.

(a) Hazardous Wastes Management,
(b) Fine Particles Processing,
(c) Environment Clearance of Industries,
(d) Industrial Environment Management Practices.
(e) National Symposium on Development of Water Resources in Mine Areas (1994).
(f) National Symposium on Plantation in Wasteland (1995)
(g) International Conference on Minerals & Metallurgical Industries Waste Utilization (MIMIWU – 96)
(h) International Conference on Non-Conventional Construction Materials (NOCMAT-97)
(i) International Symposium on Environmental Management of Mining and Metallurgical Industries (EMOMAMI-98).
(j) Short High Temperature Technology for Processing of Metals and Materials.
(k) International Symposium on Processing of Chemical and Metallurgical Industries' Wastes (POCMIW-2000)'.
(l) Short course on Management of Industrial Wastes.
(m) Short course on Disaster Management.
(n) National Seminar on Management of Fly ash, (MOFA-2001).
(o) National Symposium on Disaster Management (NSDM- 2002)
(p) International Symposium on Processing of Chemical, Mining and metallurgical Industries Wastes (POCMIW- 2003).

(q) National Symposium on Nano-Materials and Composites , (NSNC-2003).

(r) National Symposium on Water Resource Management in Mine Areas (WARMMA-2004)

(s) International Symposium on Environmental Management of Mining and Metallurgical Industries (EMOMAMI-2005).

(t) Orientation Workshop on Management of Sponge Iron Industry (2006)

(u) National Symposium on water Resource Management for Sustainable Development (WRMSD – 2006)

(v) International Symposium on Environment Friendly Technology in Mineral Processing and Metal Extraction (AETMME – 2006)

(w) Awareness Programme on Utilization of Fly-ash in Agriculture at NTPC, Kaniha, Talcher (2006)

(x) Harvesting, Power Generation and Industrial Recycling of Water (HPIRW – 2007).

(y) National Conference on "Management of Raw Materials for Iron and Steel Industry (MRMISI – 2007)

(z) Short Course on Processing of Low Grade & Complex Ores and Minerals.

(a-i)International Symposium on "Environment and Waste Management of Mining & Mineral Based Industries (EWMMI – 2008)

(b-i)National Conference on "Water Resource Development in Mining and Mineral based Industries" (WRDMMI – 2008)

(c-i) National Symposium on "Advances in Mining, Mineral Processing & Extractive Metallurgy (AMMPEM – 2008)

(d-i) International Symposium on Waste, Energy & Environment Management of Mining & Mineral Based Industries (WEEMMI – 2009)

(e-i) National Symposium on "Raw Materials & Energy Management of Mineral Based Industries (REMMI – 2009).

(f-i) Short Course on Industrial Waste & Environment Management Practices (IWEMP – 2009).

(g-i) National Symposium on "Water Resource Management for Sustainable Development (WRMSD – 2010).

(h-i) International Symposium on "Environment Management of Mining and Mineral Based Industries (EMOMAMI – 2010).

(i-i) Training Programme on Rain Water harvesting & water Resource Management (RHWM – 2011)

(j- i) National Conference on "Processing of Low Grade & Complex Minerals and Wastes (PLCMW – 2011).

(k-i) International Symposium on Advances in Environment Friendly Technology in Mineral Processing and Metal Extraction (AETMME-2012).

(l-i) Short Course on Water Resource Management and Conservation (WRMC-2012).

(m-i) International Symposium on "Management of Raw Materials for Metallurgical and Power Industries (MRMMPI – 2013)

9. Publication of the Quarterly Journal entitled Journal of Sustainable Planet.

The Institute of Advance Technology & Environmental Studies (IATES) has started publishing the Quarterly Journal entitled "**Journal of Sustainable Planet**" with effect from September 2010. Keeping in view, the aims and objectives of the IATES, the technical papers (both R & D work and review) being published in the Journal are in the areas of conservation and development of natural resources, mining of minerals, mineral processing, process metallurgy, water, forest, soil and ocean resources, industrial waste & environmental management etc. All papers are reviewed by the experts in the respective areas. The papers accepted for publication are authored by highly qualified and experienced scientists and engineers in the respective areas. It is felt that, the **Journal of Sustainable Planet** which is unique of its kind, would be highly beneficial to the professionals working in the industrial, R & D and educational sectors.

10. Efforts towards Development of Water Resources, Plantation and Environment protection in Mines, Waste Lands etc.:

(a) Under the leadership of Prof. Jena, studies on utilization of mine water in a Chromite mine in Orissa and a Limestone mine in Uttarkhand both in India, were successfully undertaken. In order to consolidate efforts in this direction, he organized a national Symposium on "Development of Water Resources in Mine Areas" at New Delhi in June 1994. This symposium was sponsored by the

National Institute of Hydrology, Government of India and the Council of Scientific & Industrial Research, India.

(b) In mid 80's, a project on the impact of science and technology on the integrated development of the Andaman & Nicobar Islands of India, was taken up under the leadership of Dr. Jena. This project was sponsored by the Department of Science and Technology, Government of India. In this project, Dr. Jena and his team visited different areas of the Andaman & Nicobar Islands and suggested various measures for socio-economic development with special emphasis on protecting the ecology of the Islands. In this regard, a workshop was also organized by Dr. Jena at New Delhi where the future line of action was identified.

(c) Nearly one third of the land in India are found to be barren or considered as the wasteland including the barren mine areas, sandy coastal regions and swampy low lying areas. As the Director of the Regional Research Laboratory at Bhubaneswar for about 18 years and as an active member of the Planning Board of Orissa for about twelve years, Prof. Jena had advised in various ways for the plantation programmes in the wasteland of the region,. In this regard, he organized a national symposium on "Plantation in Wasteland" at New Delhi in March 1995, which was sponsored by the Ministry of Forest & Environment, Government of India.

11. Social Activities

1) Prof. Jena since his scientific carrier has been undertaking a lot of programmes to bring science & technology to the doors of the common man. He has written a large number of popular scientific articles in Oriya and English Newspapers and periodicals on natural resources conservation and development with particular reference to minerals, water and forest and also in the area of environment protection and pollution control.
2) Under the leadership of Dr. Jena, Community Health Survey in some mine areas of Orissa have been carried out and recommendations have been made to improve the health status of the communities in those areas.
3) In order to enlighten the neo-literates about the scope of utilizing the natural resources for their socio economic benefits, a number of books have been

published in Oriya under his leadership under the auspices of Natural Resources Foundation (NRDF) in collaboration of National Book Trust of India (NBT).

4) In order to enlighten the Adivasi people living in the forest and mine areas of Keonjhar, Orissa, a few years back Prof. Jena has set up a foundation known as Human Resource Development Foundation (HRDF) in the heart of the Adivasi villages at Chandposi and a primary school for the Adivasi children is also functioning there.

12. Contribution of Prof. Jena towards various developmental programmes of Odisha

Soon after joining as the Director of Regional Research Laboratory, Bhubaneswar in the year 1972, Prof. Jena was invited to be the member of Planning Board, Government of Odisha. He continued as the member of the Planning Board for about 12 years. During this period, he assisted the Govt. of Odisha in various industrial and socio economic developmental programmes of the State. He was also a member of the Board of Directors of Industrial Development Corporation (IDC) of Odisha and rendered technical services to various units of IDC for better performance. During this period, Prof. Jena was instrumental in setting up the Pathani Samanta Planatorium, Science Centre (presently Science Park) and Institute of Physics, Bhubaneswar and was the first Chairman of both the former ones.

LIST OF RESEARCH PUBLICATIONS

01. Studies on the behaviour of Bi-Univalent salts in aqueous solution, Part VII (Nickel Acetate) – P. K. Jena, S. Aditya and B. Prasad, J. Ind. Chem. Soc. Vol.30, No.11, 1953, p.735.

02. Studies on the behaviour of Bi-Univalent salts in aqueous solution, Part IX (Cadium Perch Iorate) – P.K. Jena and B. Prasad, J. Ind. Chem. Soc Vol. 31, 1954, p. 480.

03. Determination of the solubility product of nickel hydroxide P.K. Jena and B. Prasad, J. Ind. Chem. Soc. Vol.33, 1956, p. 79.

04 Determination of the standard electrode potential of $Ag/Ag_2\ CrO_4$, Cr_4^{-2} electrode – P.K. Jena and B. Prasad, J. Ind. Chem. Soc. Vol. 37, No. 10, 1960, p.634.

05. Separation of Niobium and Tantalum by Chlorination – S. Zahed Hussain & P.K. Jena, Trans. Ind. Inst. Metals, Vol. 14, 1961, p. 220.

06. Studies on the behaviour of Uni- Bivalent salts in aqueous solution, Part I (Potassium, Ammonium, Lithium and Sodium Sulphates and determination of the Standard electrode potential of $Hg/Hg_2\ SO_4$, SO_4^{--} Electrode) – S.C. Sircar, P.K. Jena and B. Prasad, J. Ind. Chem. Sec. Vol.38, 1961, p.101.

07. Studies on the behaviour of Bi – Bivalent salts in aqueous solution, Part I, (Cadium Sulphate) - P.K.Jena and B. Prasad, J. Ind. Chem. Soc. Vol. 39, 1962, p. 33.

08. Separation of Niobium and Tantalum by Preferential Reduction of Mixed Oxides by Aluminium followed by chlorination – V.S. Surana, S. Zahad Hussaain and P.K. Jena, Trans. Ind. Inst. Metals, Vol. 16, 1963, p. 144..

09. Preparation of pure pentachlorides of niobium and Tantalum - K.R. Srinivasan, S. Zahed Hussain and P.K. Jena, Trans. Ind. Inst. Metals, Vol. 16, 1963, p. 137.

10. Calciothermic Reduction of Niobium (Columbium) Pentoxide - C.K. Gupta and P. K .Jena, Trans. Ind. Inst. Met. Soc. AIME, Vol. 230, 1964, p. 1433.

11. The oxidation of carbon by $Cu_2\ O$ -PbO- SiO_2 melts by A.P. Joshi, P.K. Jena and C.S. Samis, Canadian Metallurgical Qtly. Vol. 3, 1964, p. 79.

12. Extractive Metallurgy of Niobium and Tantalum - C.K. Gupta and P.K .Jena, Trans. Ind. Inst. Metals, Vol. 18, 1965, p. 80.

13. Bomb Reduction of tantalum pentoxide by calcium metals - C.K. Gupta and P.K. Jena, J. Less Common Metals, Vol. 8, 1965, p.90.

14. Chemical benification of Quilon ilmenite by High Temperature Hydrochloric Acid Leaching - J.C. Sehra, J. B. Ganamoorthy, H.S. Gadiyar, Ch. S. Rao and P.K. Jena, Trans. Ind. Inst. Metals, Vol. 19, 1966, p.114.

15. Kinetics of the chlorination of niobium pentoxide with chlorine in presence of excess of graphite powder - O. K. Mehra, S. Zahed Hussain and P.K. Jena, Trans. Ind. Inst. Metals, Vol. 19 (1), 1966, p. 53.

16. Kinetics of uranium dioxide sintering between 960^0 C and 1500^0C in dry hydrogen atmosphere - Paras Ram, H.S. Gadiyar and P.K. Jena, J. Less Common Metals, Vol. 10, 1966, p. 185.

17. Separation of Niobium and Tantalum from their mixed oxide by chlorination in presence of Carbon Monoxide - K.R. Srinivasan and P.K. Jena, Trans. Ind. Inst. Metals, Vol. 19, 1967, p. 60.

18. Calciothermic Reduction of Niobium Pentachloride – V. S. Surana and P.K.Jena, Trans. Ind. Inst. Metals, Vol.120, 1967, p.269.

19. Aluminothermic Reduction of Tungtic Oxide - C.K. Gupta and P.K.Jena, J. Less Common Metals, Vol.20, 1967, p. 208.

20. Kinetics of the chlorination of tantalum pentoxide with chlorine in presence of excess of graphite powder – O.K.Mehra and P.K.Jena, Trans. Ind. Inst. Metals, Vol. 20, 1967, 208.

21. Kinetics of the corrosion of 302 and 321 stainless steels in nitric acid by P.R. Shibad, J. Balachandra and P.K. Jena, Ind. J. Appl. Chem. Soc. Vol.30, Nos. 4-4, 1967, p.69.

22. Kinetics of the corrosion of 302 and 321 stainless steels in nitric acid P.R Shibad, P.K. Jena and J. Balachandra, Ind. J. Appl. Chem. Vol. XXX, N.3-4, p.69(1967).

23. Preparation of Niobium and Tantalum Metal Powders by Calciothermic Reduction of their Pentoxides – J.C. Sehra, D.K. Bose and P.K. Jena, Trans. Ind. Inst. Metals, Vol. 21(1), 1968, p.21.

24. Preparation of Ductile Vanadium by Calciothermic Reduction of Vanadium Pentoxide – D.K. Bose and P.K. Jena, Trans. Ind. Inst. Metals, Vol.20, 1967, p.243.

25. Production of Tantalum Metal by Aluminothermic Reduction of its Pentoxide – C.K. Gupta and P.K. Jena, J.Metals, Vol.20, 1968, p.25.

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30. Preparation of Capacitor Grade Tantalum Powder – D.K. Bose, J.C. Shera and P.K. Jena, Trans. Ind. Inst. Metals, Vol. 23(2), 1970, p.1.

31. Aluminothermic Reduction of Molybdenite Concentrate under Vacuum – L.R. Venkataramani, D.K.Bose and P.K. Jena, Trans. Ind. Inst. Metals, Vol.23(1), 1970, p.56.

32. Aluminothermic Reduction of Vanadium Pentoxide – D.K. Bose and P.K. Jena , Trans. Ind. Inst. Metals, Vol.22(1), 1970, p.56.

33. Preparation of Tatania from llmenite by selective H_2 S Sulphidisation – S.K. Jain, P.M. Prasad and P.K. Jena, Met. Trans. Vol.1, 1970, p.1527.

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35. Extraction and utilization of Pure Niobium and Tantalum from Indian ores – A.D. Damodaran, S.G. Despande, A.A. Majumdar, M. S. Sastri, P.K. Jena, D.K. Bose, S.C. Chandra, C.K. Gupta and A.K. Taneja, Proceedings of the Indian National Science Academy, vol.36, A. No,.5, 1970, p.306.

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