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A) Educational Qualifications

Degree	Year of Passing	University/Institute
Phd	1996	MDU Rohtak
M.Sc Chemistry (Gold Medalist)	1991	MDU Rohtak
Graduation	1988	MDU Rohtak

B) Career Profile

Designation	Institution Served	Duration		Experience
Associate Professor	A.I. Jat H.M. College	1996	Till Date	23 years

C) Research Advisory

No. of Students supervised	Phd	M.Phil.
6	4	2

D) Projects Undertaken

Title of the Project	Duration	Funding Agency	Status
Nano-CIS	2011-2015 (4 years)	Marie Curie Program-European Commission	Completed
"The Eco-technopia 21 project"	2006-2008 (2 years)	Korea Ministry of Environment, S. Korea	Completed
DeSO _x -DeNO _x using Hollow Fiber Membrane Contactor	2006-2008 (2 years)	Korean Federation of Science and Technology (KOFST), S. Korea	Completed
Simultaneous removal of SO _x -NO _x by novel absorbent/oxidant	2002-2004 (2 years)	Korean Federation of Science and Technology (KOFST), S. Korea	Completed
Flue gas Desulphurization	2002-2004 (2 years)	KEM Co., Ltd. & Ministry of Commerce, Industry & Energy, Korea	Completed

E) Patents :

1) **US Patent**

Title: Process for removing sulfur dioxide & nitrogen oxides from flue gas using chlorine dioxide

Inventors: *Hyung Keun Lee, Won Kil Choi, Hang Dae Jo, Dong SeopJin, **Bal Raj Deshwal***

Date of Publication : 2008. 11. 25

Patent Number : US 7455820 B2

2) **Korean Patent**

Title: Process for removing sulfur dioxide and nitrogen oxides from flue gas using chlorine dioxide

Inventors: *Lee Hyung Keun, Choi Won Kil, Jo Hang Dae, Jin Dong Seop&**Bal Raj Deshwal***

Date of Publication : 2006. 09. 05

Patent Number : 10-0622990

F) Publications

BOOKS:

Title : ***Comprehensive Engineering Chemistry - 2008***

Authors : Devender Jakhar, **Bal Raj Deshwal**, Satish Vats

Publisher : I.K. International, New Delhi

ISBN No. : 978-81-89866-55-6

-RESEARCH PAPERS :

i) **Published in Referred/Peer viewed Journals and edited books : 51**

Year 2017

- 1) **B. R. Deshwal**, B R. Park & H. K. Lee, "Surface modification of polymeric flat-sheet membranes by adding oligomeric fluoroalcohol", *J. Applied Polymer Sci.*, (ISSN: 0021-8995), Communicated.

- 2) **B. R. Deshwal** and Neha Kundu, "Comparing acidic sodium hypochlorite and sodium chlorite solutions in controlling NO_x emission", *Environ. Eng. Sci.*, (ISSN: 1092-8758), Accepted.

Year 2016

- 3) Deshwal J.P., Neha Kundu, Saharan, J.P. & **Deshwal B.R.**, "Physico-chemical studies of water-quality parameters of drinking water - A case study of rural areas of Narwana Tehsil, Haryana (India)", *International Journal of Current Research* (ISSN: 0975-833X), 8-9 (2016) 39329-39333. **SJIF =6.226**
- 4) Deshwal J.P., Neha Kundu, Saharan, J.P. & **Deshwal B.R.**, "Chemometric studies of water-quality parameters of drinking water - A case study of Narwana City, Haryana (India)", *International Journal of Current Research* (ISSN: 0975-833X), 8-2 (2016) 26591-26595. **SJIF =6.226**

Year 2015

- 5) **Deshwal Bal Raj** and Kundu Neha, "Simultaneous removal of NO and SO₂ from simulated flue gas using Fe (II) EDTA coupled with catalytic regeneration, *International Research Journal of Environment Sciences* (ISSN: 2319-1414), **2015, 4 (7) 63-69 SJIF =0.675**
- 6) **B. R. Deshwal** and N. Kundu, "Physico-chemical aspects of solubility of reactive gases in water", *Asian Journal of Chemistry* (ISSN: 0970-7077), 27-12 (2015) 4429-4435. **I.F = 0.355**
- 7) J.P. Saharan, J.P. Deshwal & **B.R. Deshwal**, "Chemometric studies of water-quality parameters of drinking water - A case study of Narwana City, Haryana (India)", *Nature and Science* (ISSN: 1545-0740), 13-7 (2015) 88-93 (ICV 2013: 7.87).
- 8) **Bal Raj Deshwal** & Neha Kundu, "Reaction Kinetics of oxidative absorption of nitric oxide into sodium hypochlorite solution", *International Journal of Advanced Research in Science and Technology* (ISSN: 2319-1783), 4-2 (2015) 313-318. **I.F = 2.179**
- 9) **Deshwal Bal Raj** & Kundu Neha, Kinetic Study on Anodic Growth of Film on Tantalum in Aqueous Succinic Acid, *Research Journal of Chemical Sciences*, (ISSN: 2231-606X), 5-5 (2015) 78-84. **I.F=0.9908**

- 10) **B. R. Deshwal** & Neha Kundu, High Field Ionic Conduction in Anodic Oxide Films on Tantalum in Aqueous Acetic Acid Medium, *Journal of Chemistry and Chemical Sciences*, (ISSN: 2229-760X), 5-5 (2015) 181-190. **I.F.=2.89**

Year 2011

- 11) Neeraj Rohella & **Bal Raj Deshwal**, Effect of Icterus nature of Serum sample on the analysis of serum analytes, *International Journal of Science, Engineering & Comp. Technol.*, (ISSN: 2231-508X) 1-1 (2011) 100-104.
- 12) Neeraj Rohella & **Bal Raj Deshwal**, Effect of Icterus nature of Serum sample on the analysis of serum analytes: the relation of unconjugated bilirubin and conjugated bilirubin on the estimation of Creatinine, *International Journal of Science, Engineering & Comp. Technol.*, (ISSN: 2231-508X) 1-1 (2011) 110-114.

Year 2009

- 13) Hyun Hee Park, **Bal Raj Deshwal**, Hang Dae Jo, Won Kil Choi, In Won Kim, Hyung Keun Lee, Absorption of Nitrogen Dioxide by PVDF Hollow Fiber Membranes in the G-L Contactor, *Desalination*, (ISSN No. 0011-9164), 243 (2009) 52-64. **I.F.= 3.960**
- 14) Manjula Spah, Dal Chand Spah, **Bal Raj Deshwal**, Seung Moon Lee, Yoon KeunChae, Jin Won Park, "Thermodynamic studies on corrosion inhibition of aqueous solutions of amino/carboxylic acids towards copper by EMF measurement, *Corrosion Science* (ISSN: 0021-938X) 51-6 (2009) 1293-1298. **I.F. =3.261**
- 15) **Bal Raj Deshwal**, Hyung Keun Lee, "Mass transfer in the absorption of SO₂& NO_x using aqueous euechlorine scrubbing solution, *Journal of Environmental Sciences* (ISSN: 0304-3894), 21 (2009) 155-161. **I.F. = 1.922**

Year 2008

- 16) **Bal Raj Deshwal**, Dong-SeopJin, Seung Hyun Lee & Hyung Keun Lee "Removal of NO from the flue gas by aqueous chlorine-dioxide scrubbing solution in a lab-scale bubbling reactor" *Journal of Hazardous Materials* (ISSN: 0304-3894) 150-3 (2008) 649-655. **I.F.= 4.331**
- 17) Hyun Hee Park, **Bal Raj Deshwal**, In Won Kim & Hyung Keun Lee, Absorption of SO₂ from flue gas using PVDF hollow fiber membranes in a gas-liquid contactor", *J. Membrane Science*, (ISSN: 0376-7388) 319 (2008) 29-37. **I.F.= 4.908**

- 18) Sung Youl Park, **Bal Raj Deshwal**, Seung Hyun Moon, NO_x removal from flue gas of oil-fired boiler using plasma-catalyst hybrid system, *Fuel Processing Technology*, (ISSN: 0378-3820), 89-5 (2008) 540-548. **I.F.= 3.019**
- 19) **Bal Raj Deshwal**, Dong-SeopJin& Hyung Keun Lee, Study on the removal of NO_x from simulated flue gas using acidic NaClO₂ solution, *Journal of Environmental Sciences*, (ISSN:1001-0742), 20 (2008) 33-38. **I.F. = 1.922**
- 20) **Bal Raj Deshwal**, Anu Sharma, Krishan Chander Singh, Speeds of sound and excess isentropic compressibilities of butyl acetate + aromatic hydrocarbons, *Chin. J. Chem. Eng.*, (ISSN: 0095-9782), 16 -4 (2008) 599-604. **I.F.= 0.872**
- 21) **B.R. Deshwal**& K.C. Singh, "Thermodynamics of 1:1 electrolyte solutions at 298.15K in aqua-DMF mixed solvent system: Excess volume of mixing", *Physics and Chemistry of Liquids: an International Journal*, (ISSN: 0031-9104) 46-6 (2008) 599-609. **I.F.= 0.517**

Year 2007

- 22) **B.R. Deshwal**& K.C. Singh, "Thermodynamics of 1:1 electrolyte solutions at 308.15K in aqua-dioxane mixed solvent: excess volume of mixing", *South African Journal of Chemistry*, (ISSN: 0379-4350) 60 (2007) 52-57. **I.F.= 0.43**
www.researchgate.net
- 23) Naveen Verma, Sanjeev Maken, **Bal Raj Deshwal**, Krishan Chander Singh, Molar excess volume of sec- and tert-butyl chloride with aromatic hydrocarbons at T = 298.15K, *J. Chem. Eng. Data*, (ISSN: 0021-9568), 52 (2007) 2083-2085. **I.F. = 2.045**
- 24) **B.R. Deshwal**, Hyun Hee Park, Bo-Ryeong Park et al., "Absorption of SO₂ from flue gas using PVDF hollow fiber membrane contactors", *Theories and Applications of Chem. Eng.*, 13-1 (2007) 217-220.
- 25) Sung Youl Park, Mina Park, **Bal Raj Deshwal**, Il Hyun Kaek, Seung Hyun Moon, The preparation of nano-size metal oxide catalysts for direct decomposition of N₂O in flue gas 1. Preparation of anodized aluminum oxide, *Proceedings of the 6th international symposium on coal combustion* (2007) 348-351, *Wuhan, China*.
- 26) Sung Youl Park, Mina Park, Jusu Hyun, Hyung Keun Lee, **Bal Raj Deshwal**, Seung Hyun Moon, The effect of sorbent specific surface area on SO₂ removal from in-duct flue gas treatment, *Proceedings of the 6th international symposium on coal combustion* (2007) 352-356, *Wuhan, China*.

Year 2006

- 27) Dong SeopJin, **Bal Raj Deshwal** & Hyung-Keun Lee, “Simultaneous removal of SO₂ and NO by wet scrubbing using aqueous chlorine-dioxide solution”, *Journal of Hazardous Materials* (ISSN: 0304-3894), 135 (2006) 412-417. **I.F.= 4.331**
- 28) **B.R. Deshwal**, H. K. Lee & K.C. Singh, “Excess volume of mixing of 1:1 electrolyte solutions at 308.15K in aqua-DMF mixed solvent system”, *Journal of Molecular Liquids*, (ISSN: 0167 7322) 123 (2006) 38–42. **I.F.= 2.083**

Year 2005

- 29) **Bal Raj Deshwal** & Hyung Keun Lee, “Manufacture of chlorine-dioxide from sodium chlorite: State of Art”, *Journal of Industrial and Engineering Chemistry* (ISSN: 1226-086X), 11-3 (2005) 330-346. **Review article I.F.= 2.063**
- 30) **Bal Raj Deshwal** & Hyung Keun Lee, “Manufacture of chlorine-dioxide from sodium chlorate: Process Chemistry”, *Journal of Industrial and Engineering Chemistry* (ISSN: 1226-086X), 11-1 (2005) 125-136. **Review article I.F.= 2.063**
- 31) S. Maken, **B. R. Deshwal**, Anu, K. C. Singh, S. J. Park & J. W. Park “Vapour–liquid equilibria of butyl acetate with aromatic hydrocarbons at 298.15K”, *Physics and Chemistry of Liquids*, (ISSN: 0031-9104) 43 (2005) 149–156. **I.F.= 0.517**
- 32) **Bal Raj Deshwal** & Krishan Chander Singh, “Excess Volume of Mixing of 1:1 Electrolyte Solutions at 298.15K in Aquo-1,4-dioxane Mixed Solvent System”, *Journal of Solution Chemistry* (ISSN: 0095-9782), 34(2005) 755-767. **I.F. = 1.335**
- 33) **Bal Raj Deshwal**, Hyung Keun Lee, Sanjeev Maken & Krishan Chander Singh “Excess Enthalpies of Mixing of Binary Mixtures of NaCl, KCl, NaBr and KBr in Mixed Ternary Solvent Systems at 298.15 K”, *South African Journal of Chemistry*, (ISSN: 0379-4350) 58 (2005) 105–109. **I.F.= 0.43** www.researchgate.net
- 34) Hyung-Keun Lee, **Bal Raj Deshwal** & Kyung-Seum Yoo, “Simultaneous Removal of SO₂ and NO_x by Sodium Chlorite Solution in Wetted-Wall Column”, *Korean J. Chem. Eng.*, (ISSN: 0256-1115) 22 (2005) 208-213. **I.F = 1.241**
- 35) Sanjeev Maken, **Bal Raj Deshwal**, Renu Chadh, Anu, Krishan Chander Singh, Hwayong Kim, Jin-Won Park “Topological and thermodynamic investigations of molecular interactions in binary mixtures: molar excess volumes and molar excess enthalpies” *Fluid Phase Equilibria* (ISSN: 0378-3812) 235 (2005) 42–49. **I.F.= 2.253**

- 36) **B.R. Deshwal**, S. Maken, H.K. Lee & K.C. Singh, "Enthalpy of mixing of univalent electrolyte solutions at different ionic strengths at 308.15 K in aqua-DMF mixed solvent system", *Thermochimica Acta* (ISSN: 0040-6031) 427 (2005) 101-107. **I.F.= 2.105**

Year 2004

- 37) **Bal Raj Deshwal** & Hyung Keun Lee, "Kinetics and mechanism of chlorine based chlorine-dioxide generation process from acidic sodium chlorate", *Journal of Hazardous Materials* (ISSN: 0304-3894) B108 (2004) 173-182. **I.F.= 4.331**
- 38) Sanjeev Maken, Umesh Bhardwaj, **Bal Raj Deshwal**, Krishan Chander Singh, Jin-Won Park, Sang Do Han, "Vapor-Liquid Equilibria of 2-Butanol + Aromatic hydrocarbons at 308.15K", *Physics and Chemistry of Liquids*, (ISSN: 0031-9104) 42 (2004) 447- 456. **I.F.= 0.555**
- 39) **Bal Raj Deshwal** & Hyung Keun Lee, "Variation in ClO₂/Cl₂ Ratio in Chloride-Chlorate Process under Different Conditions", *Journal of Industrial and Engineering Chemistry* (ISSN: 1226-086X) 10:4 (2004) 667-673. **I.F.= 2.043**
- 40) **Bal Raj Deshwal**, Hang-Dae Jo & Hyung-Keun Lee, "Reaction Kinetics of Decomposition of Acidic Sodium Chlorite", *Canadian Journal of Chemical Engineering* (ISSN: 0008-4034) 82 (2004) 619-623. **I.F. = 1.313**
- 41) Sanjeev Maken, Jong Jin Park, Umesh Bhardwaj, Krishan Chander Singh, Jin-Won Park, Sang Do Han, **Bal Raj Deshwal** "(Vapour + liquid) equilibria of (1-butanol + benzene, or toluene, or o, or m, or p-xylene) at T of 308:15 K", *Journal of Chemical Thermodynamics* (ISSN: 0021-9614) 36 (2004) 309-315. **I.F.= 2.423**
- 42) Dong-SeopJin, Bo-Reong Park, Hang-Dae Cho, Won-Kil Choi, **Bal Raj Deshwal**, Young-Seong Park, & Hyung-Keun Lee, "Reaction Mechanism in the Sulfur dioxide and Nitric oxide Removal using Euchlorine Gas", *Theories and Applications of Chem. Eng.*, 10-2 (2004) 1732-1735.
- 43) Dong-SeopJin, Bo-Ryoung Park, Hang-Dae Cho, Won-Kil Choi, **Bal Raj Deshwal**, Young-Seong Park, & Hyung-Keun Lee,"Effect of ClO₂ Feeding Rate on Simultaneous Reaction of SO₂& NO_x Removal by ClO₂",*Theories and Applications of Chem. Eng.*, 10-2 (2004)1727-1730.)
- 44) Bo-Ryoung Park, Dong-SeopJin, Hang-Dae Jo, Won-Kil Choi, **Bal Raj Deshwal** & Hyung-Keun Lee, "Study on Reaction Kinetics of the Decomposition of Acidic Sodium chlorite,*Theories and Applications of Chem. Eng.*, 10-2 (2004) 1736-1739.

Year 2003

- 45) **B.R. Deshwal** & K.C. Singh, "Enthalpy of mixing of 1:1 electrolytic solutions at varying ionic strengths at 298.15K in water + 1,4-dioxane mixed solvent system", *Indian Journal of Chemistry, Sec. A* (ISSN: 0376-4710) 42A (2003) 467-472. **I.F.= 0.628**
- 46) **Bal Raj Deshwal**, Dong-SeopJin, Hag-Dong Kim, Hang-Dae Jo, Won-KilChoi, Hyung-Keun Lee. "Study on ClO₂ Production from NaClO₃ to Remove SO_x and NO_x", *Theories and Applications of Chem. Eng.*, 9-2 (2003) 2191-2194.
- 47) Dong-SeopJin, Bo-Ryoung Park, Hang-Dong Kim, Hang-Dae Cho, Young Sung Park, **Bal Raj Deshwal**, & Hyung-Keun Lee, Study on ion concentration of reaction solution and secondary pollutants in the simultaneous removal of SO₂ and NO_x using NaClO₂", *Theories and Applications of Chem. Eng.*, 9-2 (2003) 2344-2347.
- 48) Bo-Ryoung Park, Dong-SeopJin, Hang-Dong Kim, Won-KilChoi, **Bal Raj Deshwal**, Jong Hyeon Jung, Hyung-Keun Lee, "Effect of pH on simultaneous removal of SO₂, NO with continuous injection of NaClO₂", *Theories and Applications of Chem. Eng.*, 9-2 (2003) 2241-2244.

Before Year 2003

- 49) **B.R. Deshwal**, K. C. Singh & D.R. Schreiber, "Thermodynamics of 1:1 electrolyte solutions in water + N, N-Dimethylformamide mixed solvent system at 25°C: Molar excess enthalpy of mixing", *Journal of Solution Chemistry* (ISSN: 0095-9782) 29 (2000) 561-574. **I.F. = 1.083**
- 50) P.P. Singh & **Bal Raj**, "Thermodynamics of 1:1 electrolytic mixtures in aquo-1, 4-dioxane mixed solvent system: molar excess enthalpy", *Thermochimica Acta* (ISSN: 0040-6031) 230 (1993) 113-122. **I.F.= 2.105**
- 51) P.P. Singh & **Bal Raj**, "Topological investigations of the biological activity of drugs", *Indian Journal of Chemistry, sec. A* (ISSN: 0376-4710) 32 (1993) 1258-1284. **I.F.= 0.628**

ii) Participation in Conferences/Seminars/Workshops : 34

- 1) J. P. Deshwal, **B. R. Deshwal** & J. P. Saharan "Physio-chemical studies of water quality parameters of drinking water-A case study of Jind city, Haryana (India)" in National Seminar on Industrial Globalization and Environmental Awareness, (ISBN-

- 13: 978-1533168078) held on Feb. 11, 2016 at Government PG College, Ambala Cantt., Haryana-India
- 2) Neha, **B. R. Deshwal**, S. P. Sharma, P. Singh & J. P. Deshwal, “*Studies of quality parameters of drinking water-A case study of rural areas of Kaithal, Haryana (India)*” in National Seminar on Industrial Globalization and Environmental Awareness, (ISBN-13: 978-1533168078) held on Feb. 11, 2016 at Government PG College, Ambala Cantt., Haryana-India
 - 3) J. P. Deshwal, Neha Kundu & **B. R. Deshwal**, “*Chemometric analysis of water quality parameters of potable water-A case study of Narwana city, Haryana (India)*” in National Seminar on Utility of Basic Sciences for Engineers-UBSE-2K15, (ISSN: 2277 9876) held on Nov. 21, 2015 at B S Anangpuria Institute of Technology & Management, Faridabad-India
 - 4) J. P. Deshwal, Neha Kundu & **B. R. Deshwal**, “*Chemometric studies of water quality parameters of drinking water-A case study of rural areas of Narwana, Jind, Haryana (India)*” in National Conference on "Current Advances in Theoretical and Experimental Physics (CATEP-15) held on Nov. 07, 2015 at S. D. College, Ambala Cantt.
 - 5) **Bal Raj Deshwal** & Neha Kundu, “Study on Anodic Oxide Films on Tantalum in Succinic Acid at Different Temperatures”, 2-3rd May, 2015 in 5th International Conference On “Recent Trends in Applied Physical, Chemical Sciences, Mathematical/Statistical and Environmental Dynamics” (PCME-2015) held in Jawaharlal Nehru University, New Delhi.
 - 6) **Bal Raj Deshwal** & Neha Kundu, “*Kinetic study of absorption of NO_x from the flue gas*” in National Conference on Innovations in Science and Technology for Inclusive Development-22-23 March, 2014, Dept. of Chemistry, Ch. Charansingh University, Meerut, U.P., India.
 - 7) **Bal Raj Deshwal**, Jaipal Deshwal & Jaipal Seharan, “*Assessment of drinking water quality: A case study of Narwana, Jind, Haryana, India*” in National Conference on Emerging Trends in Chemistry (NSETC-2014), 12-13 March, 2014, Dept. of Chemistry, A J H M College, Rohtak (Haryana), India.
 - 8) **Bal Raj Deshwal**, Jaipal Deshwal & Jaipal Seharan, “*Chemometric analysis of groundwater of few villages of Narwana block in Jind district, Haryana, India*” in National Conference on Emerging Trends in Chemistry (NSETC-2014), 12-13 March, 2014, Dept. of Chemistry, A J H M College, Rohtak (Haryana), India.

- 9) **Bal Raj Deshwal**, Neha Kundu and Jaipal Deshwal, “*Absorption kinetics of nitric oxide into aqueous sodium hypochlorite solution*” in National Conference on Emerging Trends in Chemistry (NSETC-2014), 12-13 March, 2014, Dept. of Chemistry, A J H M College, Rohtak (Haryana), India.
- 10) **Bal Raj Deshwal** & Neha Kundu, “National Conference on Recent Trends in Research in Chemical Sciences-RTRCS-2014”, 21-22 Feb., 2014, Dept. of Chemistry, Manipal University, Jaipur, Rajasthan.
- 11) **Bal Raj Deshwal** & Neha Kundu, “*Reaction kinetics of acidic decomposition of sodium chlorite*” in National Conference on Green Technologies for Green Environment-GTGE-2013, 18-19 Feb., 2013, Deptt. of Chemistry, G V M Girls College, Sonapat (Haryana).
- 12) B. Mari, K.C.Singh, L. Ortiz, M. Mollar, **Bal Raj Deshwal**, “*Electrochemical fabrication and characterization of p-CuSCN/ n-ZnO hetero-junction films*”, 3rd International Conference on Green Technologies for Environmental Rehabilitation (GTER-2012) Feb 11-13, 2012, G K University, Haridwar (India).
- 13) **Bal Raj Deshwal** & Krishan Chander Singh, *Speeds of sound and excess isentropic compressibilities of butyl acetate + aromatic hydrocarbons*, 27th Annual Conference **Indian Council of Chemists**, G K Vishwavidyalaya, **Haridwar- India**, 26-28th Dec., 2008.
- 14) **Bal Raj Deshwal**, Hyun Hee Park, Bo Ryoung Park, JeongHak Seo, Won Kil Choi, Hyung Keun Lee, *Absorption of NO₂ by PVDF Hollow Fiber*, **The Membrane Society of Korea**, 9-10 Nov., 2007, **Hannam University**, Daejeon, **Korea**.
- 15) Bo Ryoung Park, Hyun Hee Park, **Bal Raj Deshwal**, Ji Won Rhim, Taek Sung Hwang, Hyung Keun Lee, *Surface modification of polymeric flat-sheet membranes by adding fluorotelomer intermediate*, **The Membrane Society of Korea**, 9-10 Nov., 2007, **Hannam University**, Daejeon, **Korea**.
- 16) Hyun Hee Park, **Bal Raj Deshwal**, Bo Ryoung Park Hang Dae Jo Hyung Keun Lee, *Preparation and characterization of PVDF hollow fiber membranes for Gas-liquid contactor*, **The Membrane Society of Korea**, 9-10 Nov., 2007, **Hannam University**, Daejeon, **Korea**.
- 17) Hyun Hee Park, **Bal Raj Deshwal**, Hang Dae Jo, Won Kil Choi, Hyung Keun Lee, *Absorption of SO₂ from flue gas using bench scale hollow fiber gas-liquid contactors*, **The Membrane Society of Korea**, 9-10 Nov., 2007, **Hannam University**, Daejeon, **Korea**.

- 18) Hyung-Keun Lee, Park Bo Ryoung, Deshwal Bal Raj, Jo Hang Dae, Rhim Ji Won, *Surface modification of polymeric membranes by adding surface modifying macromolecules*, **European Polymer Congress**, 2-6 July, 2007, Congress Centre, Bernardin, Portoroz, **Slovenia**.
- 19) Yong Taek Lee, Hyun Hee Park, Hand De Joe, Won Kil Choi, **Bal Raj Deshwal**, Hyung Keun Lee, *Mass transfer effects on removal of sulfur dioxide using PVDF hollow fiber membranes in multi stage gas-liquid contactors*, **North American Membrane Society, NAMS-2007**, May 12~16, 2007, Orlando, **Florida, USA**.
- 20) **Bal Raj Deshwal**, Hyun Hee Park, Bo Ryeong Park, Jung HakSeo, Hyung Keun Lee, *Absorption of SO₂ from flue gas using PVDF hollow fiber membrane contactor*, **Korea Institute of Chemical Engineers (KIChE) Spring Meeting**, April 19-20, 2007, Lotte Hotel, **Ulsan, S. Korea**
- 21) Hyung Keun Lee , Won Kil Choi, Hang Dae Jo, Si Hoon Lee, Yong Hoon Song, **Bal Raj Deshwal**, Seung Hyun Moon, *Removal of SO_x/NO_x using APCD system of bench scale*, **Korea Institute of Chemical Engineers (KIChE) Spring Meeting**, April 19-20, 2007, Lotte Hotel, **Ulsan, S. Korea**.
- 22) Hyun Hee Park, **Bal Raj Deshwal**, Bo Ryeong Park, Hang Dae Jo, In Won Kim, Hyung Keun Lee, *Preparation of PVDF hollow fiber membranes and absorption of SO₂ using Multi-stage G-L contactor*, **Korea Institute of Chemical Engineers (KIChE) Spring Meeting**, April 19-20, 2007, Lotte Hotel, **Ulsan, S. Korea**.
- 23) Bo Ryoung Park, Hyun Hee Park, **Bal Raj Deshwal**, Ji Won Rhim, Sang Yun Lee, Taek Sung Hwang, Hyung Keun Lee, *Surface modification via direct fluorination for G-L contactor*, **Korea Institute of Chemical Engineers (KIChE) Spring Meeting**, April 19-20, 2007, Lotte Hotel, **Ulsan, S. Korea**.
- 24) **Bal Raj Deshwal** & K. C. Singh, “*Thermodynamics of 1:1 electrolyte solutions at 308.15K in aqua-DMF mixed solvent system: Excess volume of mixing*”, **93rd Indian Science Congress** held at Acharya N. G. R Agricultural University, **Hyderabad-India**, Jan. 3-7, 2006.
- 25) H.K. Lee, **B.R. Deshwal**, H.D. Jo, B.R. Park, D.S. Jin, Y.S. Park, “*Simultaneous removal of sulfur dioxide and nitric oxide from flue gas by chlorine dioxide in lab scale bubbling reactor*” **7th World Congress of Chemical Engineering, Glasgow, Scotland**, July 10-14, 2005.

- 26) Hyung Keun Lee , Won Kil Choi, Hang Dae Jo, Si Hoon Lee, Yong Hoon Song, **Bal Raj Deshwal**, Seung Hyun Moon, Removal of SO_x/NO_x using APCD system of bench scale, (**KIChE**), April 19-20, 2007, Lotte Hotel, **Ulsan, S. Korea**.
- 27) Jin Dong-Seop, Baek Bo Ryong, Jo Hang-Dae, Choi Won-Kil, Lee Hyung-Keun, Park Young Seong, & **Bal Raj Deshwal**, “Effect of pH on simultaneous removal of SO₂& NO_x by ClO₂”, **Korea Society for Atmospheric Environment**, Spring Conference Nov.11-13, 2004, **Hanseo University**, Chungnam, Seosan, **S. Korea**.
- 28) Jin Dong-Seop, Baek Bo Ryong, Lee Hyung-Keun, Jo Hang-Dae, Choi Won-Kil, **Deshwal Bal Raj**, & Park Young Seong, “Effect of ClO₂ Feeding Rate on Simultaneous Reaction of SO₂ and NO_x removal by ClO₂”, **KIChE& KSIEC Annual Meeting**, Oct. 29-30, 2004, Hoseo University, **Asan, S. Korea**.
- 29) Jin Dong-Seop, Baek Bo Ryong, Jo Hang-Dae, Choi Won-Kil, **Deshwal Bal Raj**, Lee Hyung-Keun & Park Young Seong, “Reaction Mechanism in the Sulfur dioxide and Nitric oxide Removal using Euchlorine Gas”, **KIChE& KSIEC Annual Meeting**, Oct. 29-30, 2004, Hoseo University, **Asan, S. Korea**.
- 30) Baek Bo Ryong, Jin Dong-Seop, Jo Hang-Dae, Choi Won-Kil, **Deshwal Bal Raj**, & Lee Hyung-Keun, “Study on Reaction Kinetics of the Decomposition of Acidic Sodium Chlorite”, **KIChE&KSIEC Annual Meeting**, Oct. 29-30, 2004, Hoseo University, **Asan, S. Korea**.
- 31) Baek Bo Ryong, Jin Dong-Seop, Jo Hang-Dae, Choi Won-Kil, **Deshwal Bal Raj**, & Lee Hyung-Keun, “Simultaneous removal of NO_x-SO_x using NaClO₂”, **Korea Institute of Chemical Engineers (KIChE) Annual Meeting**, Oct. 24-25, 2003, **Hanyang University, Seoul, S. Korea**.
- 32) Jin Dong-Seop, Baek Bo Ryong, Kim Hag-Dong, Jo Hang-Dae, Choi Won-Kil, **Deshwal Bal Raj**, & Lee Hyung-Keun, “Study on ion concentration of reaction solution and secondary pollutants in the simultaneous removal of SO₂-NO_x using NaClO₂” **Korea Institute of Chemical Engineers (KIChE) Annual Meeting**, Oct. 24-25, 2003, **Hanyang University, Seoul, S. Korea**.
- 33) **Bal Raj Deshwal**, Dong-SeopJin, Hag-Dong Kim, Hang-Dae Jo, Won-Kil Choi & Hyung-Keun Lee, “Study on ClO₂ Production from NaClO₃ to Remove SO_x and NO_x” **Korea Institute of Chemical Engineers (KIChE) Annual Meeting**, Oct. 24-25, 2003, **Hanyang University, Seoul, S. Korea**.
- 34) **Bal Raj Deshwal**, Jin Dong Seop, Kim Hag Dong, Won Kil Choi, Hang Dae Jo & Hyung Keun Lee, “Kinetics and mechanism of chlorine based chlorine-dioxide

generation process from acidic sodium chlorate”, 20th *KOCS International Symposium*, July 4-5, 2003, *Daejin University, Pocheon – S. Korea*.

Other Achievements:

Major Achievements

- 1) Awarded by University **Gold Medal** in M.Sc. (Chemistry) in 1991.
- 2) Awarded by University Research Scholarship (**URF**).
- 3) Qualified **CSIR-UGC Test** in 1992 and awarded by Junior Research Fellowship (**JRF**).
- 4) **Director** of Matu Ram Institute of Engineering & Management, Rohtak for 2½ years.
- 5) **Director** of R. D. Singh School of Competitions run by Jat Education Society, Rohtak for 2 yrs.
- 6) Awarded **Shiksha Bharti Puruskar** by India Achiever Forum in 2010.

Foreign Collaborations

- 1) **Visiting Scientist** in *Scientific Exchange Program* by KISTEP, Korea, 2002-03
- 2) **Visiting Scientist** in *Brain Pool Program* sponsored by KOSEF, 2003-04.
- 3) **Visiting Scientist** in *Brain Pool Program* sponsored by KOFST, 2006-07.
- 4) **Visiting Fellow** in Polytechnic University, Madrid, Spain –March-2012 in Joint International Project i.e. nano-CIS funded by European Union.
- 5) **Visiting Fellow** in Polytechnic University, Warsaw, Poland –June-2014 in Joint International Project i.e. nano-CIS funded by European Union.

Conferences/Workshops/Symposia Participated

- 1) 20th *Korean Oil Chemists Society International Symposium*, Daejin Univ., **Korea-2003**.
- 2) *Korea Institute of Chemical Engineers Annual Meeting*, Hanyang University, **Seoul-2003**.

- 3) **Asia Pacific Economic Forum (APEC)** Conference, Seoul, **Korea-2003**.
- 4) *Korea Society for Atmospheric Environment, Hanseo University, Chungnam, Korea-2004.*
- 5) *KIChE and KSIEC Annual Meeting, Hoseo University, Asan, S. Korea-2004.*
- 6) **7th World Congress of Chemical Engineering**, Glasgow, **Scotland-2005**.
- 7) *93rd Indian Science Congress held at A. N. G. R Agricultural Univ., Hyderabad-2006.*
- 8) *Korea Institute of Chemical Engineers, Spring Meeting, Lotte Hotel, Ulsan, Korea-2007.*
- 9) **North American Membrane Society, NAMS-2007**, Orlando, **Florida, USA-2007**.
- 10) **European Polymer Congress**, Congress Centre, Bernardin, Portoroz, **Slovenia-2007**.
- 11) *The Membrane Society of Korea, Hannam University, Daejeon, Korea-2007.*
- 12) **6th international symposium on coal combustion (ISCC)**, Wuhan, **China-2007**.
- 13) *27th Annual Conference Indian Council of Chemists, G K Univ., Haridwar- India-2008.*