

Curriculum Vitae

Dr. Dhruva Kumar Singh

Dr. Dhruva Kumar Singh is a Visiting Faculty in the Department of Fuel, Minerals & Metallurgical Engineering. Prior to coming to IIT (ISM) Dhanbad, he was Head, Hydrometallurgy & Rare Earth Development Section, Materials Group, Bhabha Atomic Research Centre and Professor, Chemical Sciences, Homi Bhabha National Institute, Mumbai, Department of Atomic Energy. Dr. Singh, a gold medalist in M.Sc. (Chemistry) from Magadh University Bodh Gaya, joined Bhabha Atomic Research Centre, Mumbai, in 1991 after successful completion of one year Orientation Course in Nuclear Science, Engineering and Technology. He earned his Ph.D. from Mumbai University in 2001 and conducted Post-Doctoral Research (2002-2004) at The Florida State University, USA under world renowned nuclear scientist Prof. G.R. Choppin. Dr Singh is a recognized expert in rare earth resource processing and critical minerals, contributing over three decades at BARC to developing process flowsheets for critical, atomic and rare earths metals from primary and secondary sources. Till date Dr Singh has guided 3 M. Tech and 5 Ph.D students.

Dr. Singh holds membership in several professional bodies including Indian Institute of Metals (IIM, Mumbai Chapter) and Rare Earths Association of India (REAI). With over 300 publications in peer-reviewed journals and national/international conferences and numerous invited lectures he contributed to various scientific committees including NITI Aayog in the field of critical minerals and rare earths. For his creditable and noteworthy contributions in the development of technologies related to atomic, critical and rare earth metals and materials he has received many prestigious awards such as:

- Metallurgist of the Year Award, Ministry of Steel, Govt. of India (2015)
- IIM Hindustan Zinc Gold Medal (2019)
- INS Medal for Strategic Materials Processing (2006)
- VASVIK Award for Materials & Metallurgical Sciences and Technology (2022)
- DAE Group Achievement Awards (2018 & 2020)
- Lifetime Achievement Awards (2024): REAI, REMAC, ISAS

Research Interests

- Solvent extraction
- Hydrometallurgy of rare earths and actinides
- Membrane-based separation
- Circular economy via e-waste and industry waste recycling
- Recovery of strategic metals (REE, U, Co, Ni etc)
- Pyrometallurgical processing of critical materials

Professional Memberships

- Secretary, IIM Mumbai Chapter
- EC Member: IIM Mumbai Chapter, REAI, ASSET, ISAS
- Member: SMC, IANCAS, INSA, NAARRI, ISCAS

Publications

Peer-reviewed journal papers: 76

Book Chapters: 2

Conference Proceedings: 210

Invited Talks (2015–2024): About 50

1. Publication List:

International Journal: (76)

1. Structure property correlation for interpreting distribution coefficient of light and middle rare earth metal ions with tetra octyl diglycolamide (TODGA)– A DFT study S. Mondal, M. Anitha, **D.K. Singh**, Sk Musharaf Ali, Journal of Molecular Liquids, 426 (2025) 127466.
2. Achieving Selective U(VI) and Pu(VI) Extraction from Acidic Waste: Robust Polyethersulfone Composite Beads with Tailored Ligands, Satya Ranjan Guchhait, P. Banerjee, A. Karak, Kankan Patra, G.Singh, Arijit Sengupta, Partha Sarathi, T.P.Valsala, D.B.Sathe, R.B. Bhatt, **D.K. Singh**, Kartikey K. Yadav, Separation Science and Technology, 2025 ; <https://doi.org/10.1080/01496395.2025.2486249>.
3. Sustainable Plutonium Separation: Development and Evaluation of Polyethersulfone-Tri-isoamyl Phosphate Composite Beads, Satya Ranjan Guchhait, Kankan Patra, A.Karak, Arijit Sengupta, D.B.Sathe, R.B. Bhatt, **D.K. Singh**, Kartikey K. Yadav, Separation Science and Technology, 2025; <https://doi.org/10.1080/01496395.2025.2478428>.
4. Targeted Uranium Recovery: Leveraging Tri-isoamyl Phosphate Encapsulated Polyethersulfone Composite Beads for Efficient Recovery from Acidic Solutions, Satya Ranjan Guchhait, Kankan Patra, P. Banerjee, Arijit Sengupta, D.B.Sathe, R.B. Bhatt, Kartikey K. Yadav, **D.K. Singh**, Separation Science and Technology, 2025; <https://doi.org/10.1080/01496395.2025.2476166>.
5. Study on the extraction of neodymium metal by calciothermic reduction process, Deepak Kumar Sahoo, Prafulla S Sarode, D. N.Ambare, S. Mondal, **Dhruva K Singh**, Mineral Processing and Extractive Metallurgy: Transactions of the Institutions of Mining and Metallurgy, 2024, Vol.133 (3) 101-108.
6. Sustainable Recycling of Copper from Printed Circuit Boards with Iminodiacetamide Resin: Transformation from Electronic Scrap to Copper Oxide Nanoparticles, Ritesh

Ruhela, Nikhilesh Iyer, Chitrarekha Limje, Ashok Kumar Yadav, Manoj Yadav, Madhavi Vartak, Dibyendu Bhattacharyya, **Dhruva Kumar Singh**, ACS Sustainable Chem. Eng., 2024, 12, 687-694.

7. Rapid and reliable assaying of Tc-99 in sediment samples with novel MTPN polymeric resin, Amar D. Pant, R. Ruhela, Anilkumar S. Pillai, **D.K. Singh**, B.S. Tomar, Journal of Environmental Radioactivity, 270 (2023) 107297.
8. Study of plutonium recovery from acidic feed using polyethersulfone encapsulating TBP, DEHPA, and mixture of TBP and DEHPA beads, Satya Ranjan Guchhait, Kankan Patra, Kartikey K. Yadav, **D.K. Singh**, Arijit Sengupta, T. P. Valsala, D.B. Sathe & R.B. Bhatt, Separation Science Technology, 58 (2023) Nos.15-16, 2846-2855.
9. Studies on synthesis, densification and characterization of neodymium hexaboride, T R C Murthy, J Sonber, B.Paul, S. Majumdar, K Sairam, D.K.Sahoo, **D.K.Singh**, International Journal of Applied Ceramic Technology, 2024; 21: 1425-1437.
10. Nucleation kinetics of reactive crystallization process of ammonium di uranate: Shrishma Paik, SK Satpati, **DK Singh**, Indian Chemical Engineer, 2023, Vol. 65, No. 6, 527-542.
11. Selective Removal of uranium from aqueous streams using synergistic adsorbents, Amrita Das, J. Gupta, N.Gupta, R. H. Banerjee, M. Anitha, **D.K.Singh**, Inorganic Chemistry Communications, 156 (2023) 111284.
12. Combined Experimental and Theoretical Insights on Selectivity of Rare Earth Elements with Tetra-2-ethylhexyl Diglycolamide, S. Mondal, M. Ali, **D.K.Singh**, Chemistry Select; 8 (33), doi.org/10.1002/slct.202301842.
13. High temperature structure and vibrational properties of GdVO₄, M. Anitha, K. Sandeep, Rajak Syed, S. Kesari, R. Rao, **D.K. Singh**, S.N. Achary, Vivekanand Kain. Materials Chemistry and Physics, 295 (2023) 127120.
14. Studies on hydrometallurgical recovery of rare earth elements as mixed fluoride compound from coal fly ash using environmentally friendly organic acid, Ram Karan, T Sreenivas, **D K Singh**, Separation Science & Technology, 2023, Vol. 58, Nos. 15-16, 2856-2866.
15. Developing N,N,N',N'-tetra (2-ethylhexyl) diglycolamide encapsulated polymeric beads as promising rare earth extracting agents, Dibyasree Choudhury, Kartikey K. Yadav, **D.K. Singh**, V. Kain, Separation Science & Technology, 2023, Vol. 58, Nos. 15-16, 2665-2676.
16. Parametric optimization of Sm(III) extraction from nitrate media by employing hollow fiber membrane using Taguchi analysis, Kartikey K. Yadav, Dibyasree Choudhury, **D. K. Singh**, V. Kain, Separation Science & Technology, 2023, Vol. 58, Nos. 15-16, 2655-2664.
17. Recovery of rare earth elements from coal flyash using deep eutectic solvents as leachants and precipitating as oxalate or fluoride. Ramkaran, T. Srinivas, Ajay Kumar, **D.K.Singh**, Hydrometallurgy 214(2022) 105952.

18. A novel approach of precipitation of ammonium diuranate (ADU) by sonochemical route, Shrishma Paik, S.K. Satpati, **D.K. Singh**, Progress in Nuclear Energy 143 (2022) 104034.
19. Intensified gaseous phase precipitation of ADU through ultrasonic assisted route, Shrishma Paik, SK Satpati, **D K Singh**, Journal of Radioanalytical and Nuclear chemistry (331, pages 4227–4237 (2022)
20. Study on the effects of sonication on reactive precipitation of ammonium uranyl carbonate from pure uranyl nitrate solution, Shrishma Paik, S.K. Satpati, S.K. Gupta, M.L. Sahu, **D.K. Singh**, Journal of Nuclear Materials 557 (2021) 153222.
21. Extraction behavior of yttrium with Aliquat336 from nitrate and thiocyanate media: A microscopic view from computational analysis; Pal, U.; Yadav, K. Kartikey, **Singh, D.K.**, Saha-Dasgupta, T.; Materials Today Communications, 2021, 28, 102603.
22. Luminescence and Structural Properties of Ytterbium and Erbium Co-doped LaGaO₃ Nanophosphor for Up-conversion by polyol method, Rajak Syed, Anitha Mallavarapua, V.Sudarsan, Sandeep Kumar Agarwalla, **Dhruva Kumar Singh**, Vivekanand Kain, Solid State Sciences, 117(2021) 106626.
23. Smart YPO₄:ErYb Nanophosphor for Optical Heating, Hyperthermia, Security Ink, Cancer Endoradiotherapy and Uranyl Recovery, Authors: Abhishek Kumar Soni, Kartikey Kumar Yadav, Bheeshma Pratap Singh, Rashmi Joshi, Sudipta Chakraborty, Rubel Chakravarty, Naveen Kumar Nagaraja, **Dhruva Kumar Singh**, Vivekanand Kain, Ashutosh Dash, Raghumani Singh Ningthoujam, ACS Appl Nano Mater., 4 (2021) 850-860.
24. Shiny S. Kumar, A.Rao, K. K. Yadav, R. K. Lenka, **D. K. Singh**, B.S.Tomar, Selective removal of Am(III) and Pu(IV) from analytical waste solutions of quality control operations using extractant encapsulated polymeric beads, Journal of Radioanal. Nucl. Chem, 324(2020), 375-384.
25. Recovery of Rare Earth Elements from Coal Fly Ash Using TEHDGA Impregnated Resin, S. Mondal, A. Ghar, A. K. Satpati, P. Sinharoy, **D.K. Singh**, J.N.Sharma, T. Sreenivas, V. Kain, Hydrometallurgy, 185 (2019) 93-101.
26. Effect of electrolytic composition on current efficiency and alloy composition in electrowinning of Pr-Mg alloys using chloride electrolyte"; D. K. Sahoo, M. Anitha, **D.K. Singh**, V. Kain; Mineral Processing and Extractive Metallurgy (Trans. Inst. Min. Metall. C) 2019, DOI: 10.1080/25726641.2019.1677076, pp 1-8.
27. Separation of terbium from aqueous phase employing hollow fibre supported liquid membrane with EHEHPA as carrier, Kartikey K. Yadav, **D.K. Singh**, V Kain, Separation Science & Technology, 54 (2019) 1521-1532.
28. NdFeB magnet recycling: Dysprosium recovery by non-dispersive solvent extraction employing hollow fibre membrane contactor, Kartikey K. Yadav, M. Anitha, **D. K. Singh**, V. Kain, Separation and Purification Technology, 194 (2018) 265-271.

29. Process for recovery of uranium from low grade SDU of phosphoric acid/ D2EHPA-TBP plant origin using DHOA/n-dodecane solvent, S. Mondal, Vikas Kumar, **D.K. Singh**, J.N. Sharma, T. Sreenivas, V. Kain, Separation and Purification Technology 189 (2017) 341–346.
30. Development of a phosphate precipitation process for the recovery of uranium from carbonate ore leach liquor, **D.K.Singh**, T.Sreenivas, V.Kain, G.K.Dey, Hydrometallurgy 171 (2017) 228-235.
31. Synergistic extraction of Nd(III) with mixture of 8-Hydroxyquinoline and its derivative with di-2-ethyl hexyl phosphoric acid in different diluents, Sutanuka Roy, Sukalyan Basu, M. Anitha, **D. K. Singh**, J.K. Chakravartty, Korean Journal of Chemical Engineering, 34 (2017) 1740-1747.
32. Development of solvent extraction process for erbium purification, **D.K.Singh**, M.Anitha, V.Kain, Separation Science and Technology, 52 (2017) 2284-2290.
33. Role of additives in the matrix of solvent encapsulated beads on its yttrium sorption capacity from aqueous streams, K.K.Yadav, **D.K.Singh**, L. Varshney, V.Kain, Separation Science and Technology, 52 (2017) 2274-2283.
34. High complexation selectivity of U(VI) over Rare earth RE(III) by N,N-Dihexyl-2-ethylhexanamide (DH2EHA):experimental and theoretical evidence, Vikas Kumar, S.Mondal, M. Anitha, S.K. Musharaf Ali, **D. K.Singh**, V.Kain, Chemistry Select, 2 (2017) 2348-2354.
35. Taguchi optimisation of process parameters for electrowinning of praseodymium metal in molten salt electrolysis, D. K. Sahoo, M. Anitha, S. Mondal, **D. K. Singh**, R. Mishra, V. Kain, Mineral Processing and Extractive Metallurgy (Trans. Inst. Min. Metall. C) 126 (2017) 231-237.
36. A new bisglycolamide substituted calix-benzo-crown-6 in 1, 3-alternate conformation as a selective ionophore for Cesium(I): Combined experimental and density functional theoretical investigation, Vikas Kumar, J. N. Sharma, P.V.Achuthan, **D.K. Singh**, S.K Musharaf Ali, RSC Advances, 6 (2016) 47120-47129.
37. Recovery of uranium from phosphoric acid: a review, **D.K.Singh**, S. Mondal, J.K.Chakravartty, Solvent Extraction and Ion Exchange, 34 (2016) 201-225.
38. Parametric optimization for leaching of cobalt from Sukinda ore of lateritic origin - A Taguchi approach, S.Mondal, B.Paul, V.Kumar, **D.K.Singh**,J.K.Chakravartty, Separation and Purification Technology, 156 (2015) 827-834.
39. Sorption behavior of Y(III) from chloride medium with polymer composites containing di-2-ethyl hexyl phosphoric acid and multiwall carbon nanotube, K.K.Yadav, K. Dasgupta, **D.K.Singh**, M.Anitha, R.K.Lenka, L.Varshney, H.Singh, Separation Science and Technology, 50 (2015) 463-470.
40. Studies on yttrium permeation through hollow fibre supported liquid membrane from nitrate medium using di-nonyl phenyl phosphoric acid as the carrier phase,

- R.Vijayalakshmi, S. Chaudhury, M.Anitha, **D.K.Singh**, S.K.Aggarwal and H.Singh, Int. J. Min. Proc. 135 (2015) 52-56.
41. Solvent extraction studies of rare earths from thiocyanate medium with N,N,N',N' - tetra (2-ethyl hexyl) diglycolamide, M.Anitha, M.K.Kotekar, **D.K.Singh**, J.N.Sharma, H.Singh, Separation Science and Technology, 50 (2015) 430-436.
 42. Solvent impregnated carbon nanotube embedded polymeric composite beads: An environment benign approach for the separation of rare earths, K.K.Yadav, K.Dasgupta, **D.K.Singh**, M.Anitha, L. Varshney and H.Singh, Separation and Purification Technology, 143 (2015) 115-124.
 43. Dysprosium sorption by polymeric composite bead: Robust parametric optimization using Taguchi method, Kartikey K. Yadav, K. Dasgupta, **D. K. Singh**, L. Varshney, H.Singh, Journal of Chromatography A, 1384 (2015) 37-43.
 44. Extraction of neodymium (III) from nitric acid feed solutions using emulsion liquid membrane containing TOPO and DNPPA as the carrier extractants, M. Anitha, Dipali N Ambare, **D.K. Singh**, H.Singh and P.K.Mohapatra, Chemical Engineering Research and Design, 98 (2015) 89–95.
 45. Adsorptive separation of entrained di-nonyl phenyl phosphoric acid from merchant grade phosphoric acid by activated charcoal: kinetic and equilibrium studies; **D. K. Singh**, Kinshuk Dasgupta, Kartikey K Yadav, R. Vijayalakshmi and H. Singh, Separation Science and Technology 49 (2014) 887-897.
 46. Solvent extraction studies on rare earths from chloride medium with organophosphorous extractant di-nonyl phenyl phosphoric acid, M. Anitha, M.K. Kotekar, **D.K. Singh**, R. Vijayalakshmi and H.Singh, Hydrometallurgy, 146C (2014)128-132.
 47. New synergistic solvent mixture of DNPPA and bidentate octyl (phenyl) CMPO for enhanced extraction of uranium (VI) from phosphoric acid medium, S. Mondal, **D. K. Singh**, M Anitha, J.N. Sharma, R. C. Hubli, and H.Singh, Hydrometallurgy, 147/148 (2014) 95-102.
 48. Application of Taguchi method for optimization of process parameters in decalcification of samarium-cobalt intermetallic powder, K. Dasgupta, **D.K.Singh**, D.K.Sahoo, M. Anitha, A. Awasthi, H.Singh, Separation and Purification Technology, 124 (2014)74-80.
 49. Separation of high purity gadolinium for reactor application by solvent extraction process, R. Vijayalakshmi, **D.K.Singh**, M.K.Kotekar and H.Singh, J. Radioanal. Nucl. Chem., 300 (2014) 129-135.
 50. Studies on separation and recovery of Plutonium from nitric acid medium using Di-nonyl phenyl phosphoric acid (DNPPA) /n-paraffin as extractant system, Suman Kumar Singh, K.Venugopal, S.T.Jadhav, S.C.Tripathi, P.M.Gandhi,**D.K.Singh**, Separation Science and Technology 49(2014) 1335-1341.
 51. Non-dispersive solvent extraction of neodymium using hollow fibre contractor: Mass

- transfer modelings studies, D.N.Ambare, S.A.Ansari, M.Anitha, P. Kandwal, **D.K.Singh**, H.Singh, P.K.Mohapatra, J. Membrane Science, 446 (2013) 106-112.
52. Extraction and stripping behavior of iron(III) from phosphoric acid medium by D2EHPA alone and its mixtures with TBP/TOPO, **D.K. Singh**, K.K.Yadav and H. Singh, Separation Science and Technology, 48 (2013)1556-1564.
53. Studies on phase separation kinetics in solvent extraction for uranium recovery in DNPPA+TOPO/ MGA system, Kartikey K. Yadav, **D. K. Singh**, M. Anitha, H. Singh, Separation Science and Technology, 48 (2013) 2486 - 2493.
54. Studies on permeation of Nd(III) by supported liquid membrane using DNPPA + TOPO as carrier, M.Anitha, A, Depali, M.K.Kotekar, **D.K.Singh**,H.Singh, Separation Science and Technology, 48 (2013) 2196-2203.
55. Studies on separation of rare earths from aqueous media by polysulfone beads containing D2EHPA as extractant, Kartikey K Yadav, **D.K.Singh**, M. Anitha, L. Varshney and H. Singh, Separation and Purification Technology, 118 (2013) 350-358.
56. Comparative evaluation of tri-n-butyl phosphate (TBP) and tris (2-ethyl hexyl) phosphate (TEHP) for recovery of uranium from monazite leach solution, S. Biswas, P.N.Pathak, **D.K.Singh**,S.B.Roy, Separation Science and Technology, 48 (2013) 2013-2019.
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58. Simultaneous recovery of yttrium and uranium using D2EHPA-TBP and DNPPA-TOPO from phosphoric acid, **D.K. Singh**, M.Anitha, Kartikey K.Yadav, M.K.Kotekar,R. Vijayalakshmi, H. Singh, Desalination &Water Treatment, 38 (2012) 236-244.
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65. Studies on permeation of uranium (VI) from phosphoric acid medium through supported liquid membrane comprising a binary mixture of PC88A and Cyanex 923 in n-dodecane as carrier, S.K.Singh, S.K.Mishra, S.C.Tripathy, **D.K.Singh**, Desalination, 250, (2010) 19-25.
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70. Recovery of oxalate from scrubbing solution containing rare earths and iron produced during uranium recovery from phosphoric acid" **D.K.Singh**, H.Singh, Desalination, 232 (2008) 37-48.
71. Polymerization study of o-Si(OH)₄ and complexation of Am(III), Eu(III) and Cm(III), **D.K.Singh**, P.Thakur, G.R.Choppin, Inorg. Chim.Acta, 360 (2007) 3705-3711. [IF: 2.002]
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Book Chapter: 2

1. Dhruva Kumar Singh and Vivekanand Kain, Phosphatic resources: a valuable wealth of rare earths, for CRC press book entitled, "Critical and Rare Earth Elements: Recovery from Secondary Resources". Editors: Dr. Abhilash, Prof. Ata Akcil. 2019, Chapter 17, pp 331-342.
2. Dhruva Kumar Singh, Kartikey Kumar Yadav, Alok Awasthi, R.Tewari “Rare Earth Elements: Challenges, Opportunities and Application” in Nuclear Materials (in press) SIRD, BARC (2024).

Conference papers: 210

1. Tailored Polyethersulfone Beads with TiAP/DEHPA for Enhanced Plutonium (IV) Separation from Aqueous Acidic Feed, S.R. Guchhait, P.J. Wagh, Partha Sarathi, A. Kelkar, D.B.Sathe, R.B. Bhatt, Kartikey K. Yadav, D.K. Singh, NUCAR-2025.
2. Encapsulation of TIAP/DEHPA in Polyethersulfone Beads: A Novel Approach to Uranium (VI) Recovery, S.R. Guchhait, P.J. Wagh, Partha Sarathi, A. Kelkar, D.B.Sathe, R.B. Bhatt, D.K. Singh, NUFUC-2025.
3. Studies on a causticization process for recovery of uranium from Tummalapalle leach liquor, B.Vinith, A Chatterjee, A K Sharma, A.K.Singh, Alok Awasthi, **D K Singh**, Proceedings of 11th DAE – BRNS Biennial Symposium on Emerging Trends in Separation Science and Technology (SESTEC – 2024), HSNC University, Mumbai, India, 10-13 July, 2024, Page No. 119.
4. Correlation between bond length and distribution coefficient: A DFT Study, S Mondal, M Anitha, **D K Singh**, Sk Musharaf Ali, *ibid*, Page No. 264.
5. Amide Grafted Polymeric Resin for Uranium Recovery from Effluents, Vinita Kumari, R. Ruhela, **D.K. Singh**, *ibid*, Page No. 51.
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7. Synthesis, characterization and evaluation of polyethersulfone –tri-isoamyl phosphate composite beads for recovery of Pu from aqueous acidic feed, Satya Ranjan Guchhait, K. Patra, A. Karak, P. Banerjee, P.J. Wagh, M.A.Kesarkar, Partha Sarathi, T.P.Valsala, D.B.Sathe, R.B. Bhatt, **D.K. Singh**, *ibid*, page No. 84.
8. Study of recovery of actinides from aqueous acidic feed employing irradiated and non-irradiated polyethersulfone-TBP and DEHPA Composite Beads, Satya Ranjan Guchhait, A. Karak, P. Banerjee, P.J. Wagh, K. Patra, M.A.Kesarkar, Partha Sarathi, T.P.Valsala, D.B.Sathe, R.B. Bhatt, **D.K. Singh**, *ibid*, Page No. 88.
9. Selective recovery of U(VI) over Am(III) employing polyethersulfone-tri-isoamyl phosphate composite beads from aqueous acidic feed, Satya Ranjan Guchhait, P. Banerjee, A. Karak, K. Patra, P.J. Wagh, M.A.Kesarkar, Partha Sarathi, T.P.Valsala, D.B.Sathe, R.B. Bhatt, **D.K. Singh**, *ibid*, Page No. Page No. 106.
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