

Volume 2 Issue 1, December 2014

**International Journal of Advanced Engineering
and Nano Technology**



Blue Eyes Intelligence Engineering & Sciences Publication Pvt. Ltd.

Exploring Innovation: A Key for Dedicated Services

Address:

22, First Floor, ShivLoka Phase-IV,
Khajuri Kala, BHEL-Piplani, Bhopal (M.P.)-462021, India

Website: www.blueeyesintelligence.org

Email: director@blueeyesintelligence.org, blueeyes@gmail.com

Cell #: +91-9669981618, WhatsApp #: +91-9669981618, Viber #: +91-9669981618

Skype #: beiesp, Twitter #: beiesp

Editor In Chief

Dr. Shiv K Sahu

Ph.D. (CSE), M.Tech. (IT, Honors), B.Tech. (IT)

Director, Blue Eyes Intelligence Engineering & Sciences Publication Pvt. Ltd., Bhopal (M.P.), India

Dr. Shachi Sahu

Ph.D. (Chemistry), M.Sc. (Organic Chemistry)

Additional Director, Blue Eyes Intelligence Engineering & Sciences Publication Pvt. Ltd., Bhopal(M.P.), India

Vice Editor In Chief

Dr. Vahid Nourani

Professor, Faculty of Civil Engineering, University of Tabriz, Iran

Prof. (Dr.) Anuranjan Misra

Professor & Head, Computer Science & Engineering and Information Technology & Engineering, Noida International University, Noida (U.P.), India

Chief Advisory Board

Prof. (Dr.) Hamid Saremi

Vice Chancellor of Islamic Azad University of Iran, Quchan Branch, Quchan-Iran

Dr. Uma Shanker

Professor & Head, Department of Mathematics, CEC, Bilaspur(C.G.), India

Dr. Rama Shanker

Professor & Head, Department of Statistics, Eritrea Institute of Technology, Asmara, Eritrea

Dr. Vinita Kumari

Blue Eyes Intelligence Engineering & Sciences Publication Pvt. Ltd., India

Dr. Kapil Kumar Bansal

Head (Research and Publication), SRM University, Gaziabad (U.P.), India

Dr. Deepak Garg

Professor, Department of Computer Science and Engineering, Thapar University, Patiala (Punjab), India, Senior Member of IEEE, Secretary of IEEE Computer Society (Delhi Section), Life Member of Computer Society of India (CSI), Indian Society of Technical Education (ISTE), Indian Science Congress Association Kolkata.

Dr. Vijay Anant Athavale

Director of SVS Group of Institutions, Mawana, Meerut (U.P.) India/ U.P. Technical University, India

Dr. T.C. Manjunath

Principal & Professor, HKBK College of Engg, Nagawara, Arabic College Road, Bengaluru-560045, Karnataka, India

Dr. Kosta Yogeshwar Prasad

Director, Technical Campus, Marwadi Education Foundation's Group of Institutions, Rajkot-Morbi Highway, Gauridada, Rajkot, Gujarat, India

Dr. Dinesh Varshney

Director of College Development Counseling, Devi Ahilya University, Indore (M.P.), Professor, School of Physics, Devi Ahilya University, Indore (M.P.), and Regional Director, Madhya Pradesh Bhoj (Open) University, Indore (M.P.), India

Dr. P. Dananjayan

Professor, Department of Department of ECE, Pondicherry Engineering College, Pondicherry, India

Dr. Sadhana Vishwakarma

Associate Professor, Department of Engineering Chemistry, Technocrat Institute of Technology, Bhopal(M.P.), India

Dr. Kamal Mehta

Associate Professor, Deptment of Computer Engineering, Institute of Technology, NIRMA University, Ahmedabad (Gujarat), India

Dr. CheeFai Tan

Faculty of Mechanical Engineering, University Technical, Malaysia Melaka, Malaysia

Dr. Suresh Babu Perli

Professor & Head, Department of Electrical and Electronic Engineering, Narasaraopeta Engineering College, Guntur, A.P., India

Dr. Binod Kumar

Associate Professor, School of Engineering and Computer Technology, Faculty of Integrative Sciences and Technology, Quest International University, Ipoh, Perak, Malaysia

Dr. Chiladze George

Professor, Faculty of Law, Akhaltsikhe State University, Tbilisi University, Georgia

Dr. Kavita Khare

Professor, Department of Electronics & Communication Engineering., MANIT, Bhopal (M.P.), INDIA

Dr. C. Saravanan

Associate Professor (System Manager) & Head, Computer Center, NIT, Durgapur, W.B. India

Dr. S. Saravanan

Professor, Department of Electrical and Electronics Engineering, Muthayamal Engineering College, Resipuram, Tamilnadu, India

Dr. Amit Kumar Garg

Professor & Head, Department of Electronics and Communication Engineering, Maharishi Markandeshwar University, Mullana, Ambala (Haryana), India

Dr. T.C.Manjunath

Principal & Professor, HKBK College of Engg, Nagawara, Arabic College Road, Bengaluru-560045, Karnataka, India

Dr. P. Dananjayan

Professor, Department of Department of ECE, Pondicherry Engineering College, Pondicherry, India

Dr. Kamal K Mehta

Associate Professor, Department of Computer Engineering, Institute of Technology, NIRMA University, Ahmedabad (Gujarat), India

Dr. Rajiv Srivastava

Director, Department of Computer Science & Engineering, Sagar Institute of Research & Technology, Bhopal (M.P.), India

Dr. Chakunta Venkata Guru Rao

Professor, Department of Computer Science & Engineering, SR Engineering College, Ananthasagar, Warangal, Andhra Pradesh, India

Dr. Anuranjan Misra

Professor, Department of Computer Science & Engineering, Bhagwant Institute of Technology, NH-24, Jindal Nagar, Ghaziabad, India

Dr. Robert Brian Smith

International Development Assistance Consultant, Department of AEC Consultants Pty Ltd, AEC Consultants Pty Ltd, Macquarie Centre, North Ryde, New South Wales, Australia

Dr. Saber Mohamed Abd-Allah

Associate Professor, Department of Biochemistry, Shanghai Institute of Biochemistry and Cell Biology, Yue Yang Road, Shanghai, China

Dr. Himani Sharma

Professor & Dean, Department of Electronics & Communication Engineering, MLR Institute of Technology, Laxman Reddy Avenue, Dundigal, Hyderabad, India

Dr. Sahab Singh

Associate Professor, Department of Management Studies, Dronacharya Group of Institutions, Knowledge Park-III, Greater Noida, India

Dr. Umesh Kumar

Principal: Govt Women Poly, Ranchi, India

Dr. Syed Zaheer Hasan

Scientist-G Petroleum Research Wing, Gujarat Energy Research and Management Institute, Energy Building, Pandit Deendayal Petroleum University Campus, Raisan, Gandhinagar-382007, Gujarat, India.

Dr. Jaswant Singh Bhomrah

Director, Department of Profit Oriented Technique, 1 – B Crystal Gold, Vijalpore Road, Navsari 396445, Gujarat. India

Technical Advisory Board

Dr. Mohd. Husain

Director, MG Institute of Management & Technology, Banthara, Lucknow (U.P.), India

Dr. T. Jayanthi

Principal, Panimalar Institute of Technology, Chennai (TN), India

Dr. Umesh A.S.

Director, Technocrats Institute of Technology & Science, Bhopal(M.P.), India

Dr. B. Kanagasabapathi

Infosys Labs, Infosys Limited, Center for Advance Modeling and Simulation, Infosys Labs, Infosys Limited, Electronics City, Bangalore, India

Dr. C.B. Gupta

Professor, Department of Mathematics, Birla Institute of Technology & Sciences, Pilani (Rajasthan), India

Dr. Sunandan Bhunia

Associate Professor & Head,, Dept. of Electronics & Communication Engineering, Haldia Institute of Technology, Haldia, West Bengal, India

Dr. Jaydeb Bhaumik

Associate Professor, Dept. of Electronics & Communication Engineering, Haldia Institute of Technology, Haldia, West Bengal, India

Dr. Rajesh Das

Associate Professor, School of Applied Sciences, Haldia Institute of Technology, Haldia, West Bengal, India

Dr. Mrutyunjaya Panda

Professor & Head, Department of EEE, Gandhi Institute for Technological Development, Bhubaneswar, Odisha, India

Dr. Mohd. Nazri Ismail

Associate Professor, Department of System and Networking, University of Kuala (UniKL), Kuala Lumpur, Malaysia

Dr. Haw Su Cheng

Faculty of Information Technology, Multimedia University (MMU), Jalan Multimedia, 63100 Cyberjaya

Dr. Hossein Rajabalipour Cheshmehgaz

Industrial Modeling and Computing Department, Faculty of Computer Science and Information Systems, Universiti Teknologi Malaysia (UTM) 81310, Skudai, Malaysia

Dr. Sudhinder Singh Chowhan

Associate Professor, Institute of Management and Computer Science, NIMS University, Jaipur (Rajasthan), India

Dr. Neeta Sharma

Professor & Head, Department of Communication Skills, Technocrat Institute of Technology, Bhopal(M.P.), India

Dr. Ashish Rastogi

Associate Professor, Department of CSIT, Guru Ghansi Das University, Bilaspur (C.G.), India

Dr. Santosh Kumar Nanda

Professor, Department of Computer Science and Engineering, Eastern Academy of Science and Technology (EAST), Khurda (Orisa), India

Dr. Hai Shanker Hota

Associate Professor, Department of CSIT, Guru Ghansi Das University, Bilaspur (C.G.), India

Dr. Sunil Kumar Singla

Professor, Department of Electrical and Instrumentation Engineering, Thapar University, Patiala (Punjab), India

Dr. A. K. Verma

Professor, Department of Computer Science and Engineering, Thapar University, Patiala (Punjab), India

Dr. Durgesh Mishra

Chairman, IEEE Computer Society Chapter Bombay Section, Chairman IEEE MP Subsection, Professor & Dean (R&D), Acropolis Institute of Technology, Indore (M.P.), India

Dr. Xiaoguang Yue

Associate Professor, College of Computer and Information, Southwest Forestry University, Kunming (Yunnan), China

Dr. Veronica Mc Gowan

Associate Professor, Department of Computer and Business Information Systems, Delaware Valley College, Doylestown, PA, Allman China

Dr. Mohd. Ali Hussain

Professor, Department of Computer Science and Engineering, Sri Sai Madhavi Institute of Science & Technology, Rajahmundry (A.P.), India

Dr. Mohd. Nazri Ismail

Professor, System and Networking Department, Jalan Sultan Ismail, Kuala Lumpur, MALAYSIA

Dr. Sunil Mishra

Associate Professor, Department of Communication Skills (English), Dronacharya College of Engineering, Farrukhnagar, Gurgaon (Haryana), India

Dr. Labib Francis Gergis Rofaiel

Associate Professor, Department of Digital Communications and Electronics, Misr Academy for Engineering and Technology, Mansoura City, Egypt

Dr. Pavol Tanuska

Associate Professor, Department of Applied Informatics, Automation, and Mathematics, Trnava, Slovakia

Dr. VS Giridhar Akula

Professor, Avanthi's Research & Technological Academy, Gunthapally, Hyderabad, Andhra Pradesh, India

Dr. S. Satyanarayana

Associate Professor, Department of Computer Science and Engineering, KL University, Guntur, Andhra Pradesh, India

Dr. Bhupendra Kumar Sharma

Associate Professor, Department of Mathematics, KL University, BITS, Pilani, India

Dr. Praveen Agarwal

Associate Professor & Head, Department of Mathematics, Anand International College of Engineering, Jaipur (Rajasthan), India

Dr. Manoj Kumar

Professor, Department of Mathematics, Rashtriya Kishan Post Graduate Degree, College, Shamli, Prabudh Nagar, (U.P.), India

Dr. Shaikh Abdul Hannan

Associate Professor, Department of Computer Science, Vivekanand Arts Sardar Dalipsing Arts and Science College, Aurangabad (Maharashtra), India

Dr. K.M. Pandey

Professor, Department of Mechanical Engineering, National Institute of Technology, Silchar, India

Prof. Pranav Parashar

Technical Advisor, International Journal of Soft Computing and Engineering (IJSCE), Bhopal (M.P.), India

Dr. Biswajit Chakraborty

MECON Limited, Research and Development Division (A Govt. of India Enterprise), Ranchi-834002, Jharkhand, India

Dr. D.V. Ashoka

Professor & Head, Department of Information Science & Engineering, SJB Institute of Technology, Kengeri, Bangalore, India

Dr. Sasidhar Babu Suvanam

Professor & Academic Cordinator, Department of Computer Science & Engineering, Sree Narayana Gurukulam College of Engineering, Kadayiuruppu, Kolenchery, Kerala, India

Dr. C. Venkatesh

Professor & Dean, Faculty of Engineering, EBET Group of Institutions, Kangayam, Erode, Caimbatore (Tamil Nadu), India

Dr. Nilay Khare

Assoc. Professor & Head, Department of Computer Science, MANIT, Bhopal (M.P.), India

Dr. Sandra De Iaco

Professor, Dip.to Di Scienze Dell'Economia-Sez. Matematico-Statistica, Italy

Dr. Yaduvir Singh

Associate Professor, Department of Computer Science & Engineering, Ideal Institute of Technology, Govindpuram Ghaziabad, Lucknow (U.P.), India

Dr. Angela Amphawan

Head of Optical Technology, School of Computing, School Of Computing, Universiti Utara Malaysia, 06010 Sintok, Kedah, Malaysia

Dr. Ashwini Kumar Arya

Associate Professor, Department of Electronics & Communication Engineering, Faculty of Engineering and Technology, Graphic Era University, Dehradun (U.K.), India

Dr. Yash Pal Singh

Professor, Department of Electronics & Communication Engg, Director, KLS Institute Of Engg.& Technology, Director, KLSIET, Chandok, Bijnor, (U.P.), India

Dr. Ashish Jain

Associate Professor, Department of Computer Science & Engineering, Accurate Institute of Management & Technology, Gr. Noida (U.P.), India

Dr. Abhay Saxena

Associate Professor&Head, Department. of Computer Science, Dev Sanskriti University, Haridwar, Utrakhand, India

Dr. Judy. M.V

Associate Professor, Head of the Department CS &IT, Amrita School of Arts and Sciences, Amrita Vishwa Vidyapeetham, Brahmasthanam, Edapally, Cochin, Kerala, India

Dr. Sangkyun Kim

Professor, Department of Industrial Engineering, Kangwon National University, Hyoja 2 dong, Chunche0nsi, Gangwondo, Korea

Dr. Sanjay M. Gulhane

Professor, Department of Electronics & Telecommunication Engineering, Jawaharlal Darda Institute of Engineering & Technology, Yavatmal, Maharastra, India

Dr. K.K. Thyagarajan

Principal & Professor, Department of Informational Technology, RMK College of Engineering & Technology, RSM Nagar, Thiruyallur, Tamil Nadu, India

Dr. P. Subashini

Assoc. Professor, Department of Computer Science, Coimbatore, India

Dr. G. Srinivasrao

Professor, Department of Mechanical Engineering, RVR & JC, College of Engineering, Chowdavaram, Guntur, India

Dr. Rajesh Verma

Professor, Department of Computer Science & Engg. and Deptt. of Information Technology, Kurukshetra Institute of Technology & Management, Bhor Sadian, Pehowa, Kurukshetra (Haryana), India

Dr. Pawan Kumar Shukla

Associate Professor, Satya College of Engineering & Technology, Haryana, India

Dr. U C Srivastava

Associate Professor, Department of Applied Physics, Amity Institute of Applied Sciences, Amity University, Noida, India

Dr. Reena Dadhich

Prof. & Head, Department of Computer Science and Informatics, MBS MArg, Near Kabir Circle, University of Kota, Rajasthan, India

Dr. Aashis. S. Roy

Department of Materials Engineering, Indian Institute of Science, Bangalore Karnataka, India

Dr. Sudhir Nigam

Professor Department of Civil Engineering, Principal, Lakshmi Narain College of Technology and Science, Raisen, Road, Bhopal, (M.P.), India

Dr. S. Senthil Kumar

Doctorate, Department of Center for Advanced Image and Information Technology, Division of Computer Science and Engineering, Graduate School of Electronics and Information Engineering, Chon Buk National University Deok Jin-Dong, Jeonju, Chon Buk, 561-756, South Korea Tamilnadu, India

Dr. Gufran Ahmad Ansari

Associate Professor, Department of Information Technology, College of Computer, Qassim University, Al-Qassim, Kingdom of Saudi Arabia (KSA)

Dr. R. Navaneetha krishnan

Associate Professor, Department of MCA, Bharathiyar College of Engg & Tech, Karaikal Puducherry, India

Dr. Hossein Rajabalipour Cheshmejjaz

Industrial Modeling and Computing Department, Faculty of Computer Science and Information Systems, Universiti Teknologi Skudai, Malaysia

Dr. Veronica McGowan

Associate Professor, Department of Computer and Business Information Systems, Delaware Valley College, Doylestown, PA, Allman China

Dr. Sanjay Sharma

Associate Professor, Department of Mathematics, Bhilai Institute of Technology, Durg, Chhattisgarh, India

Dr. Taghreed Hashim Al-Noor

Professor, Department of Chemistry, Ibn-Al-Haitham Education for pure Science College, University of Baghdad, Iraq

Dr. Madhumita Dash

Professor, Department of Electronics & Telecommunication, Orissa Engineering College, Bhubaneswar, Odisha, India

Dr. Anita Sagadevan Ethiraj

Associate Professor, Department of Centre for Nanotechnology Research (CNR), School of Electronics Engineering (Sense), Vellore Institute of Technology (VIT) University, Tamilnadu, India

Dr. Sibasis Acharya

Project Consultant, Department of Metallurgy & Mineral Processing, Midas Tech International, 30 Mukin Street, Jindalee-4074, Queensland, Australia

Dr. Neelam Ruhil

Professor, Department of Electronics & Computer Engineering, Dronacharya College of Engineering, Gurgaon, Haryana, India

Dr. Faizullah Mahar

Professor, Department of Electrical Engineering, Balochistan University of Engineering and Technology, Pakistan

Dr. K. Selvaraju

Head, PG & Research, Department of Physics, Kandaswami Kandars College (Govt. Aided), Velur (PO), Namakkal DT. Tamil Nadu, India

Dr. M. K. Bhanarkar

Associate Professor, Department of Electronics, Shivaji University, Kolhapur, Maharashtra, India

Dr. Sanjay Hari Sawant

Professor, Department of Mechanical Engineering, Dr. J. J. Magdum College of Engineering, Jaysingpur, India

Dr. Arindam Ghosal

Professor, Department of Mechanical Engineering, Dronacharya Group of Institutions, B-27, Part-III, Knowledge Park, Greater Noida, India

Dr. M. Chithirai Pon Selvan

Associate Professor, Department of Mechanical Engineering, School of Engineering & Information Technology Manipal University, Dubai, UAE

Dr. S. Sambhu Prasad

Professor & Principal, Department of Mechanical Engineering, Pragati College of Engineering, Andhra Pradesh, India.

Dr. Muhammad Attique Khan Shahid

Professor of Physics & Chairman, Department of Physics, Advisor (SAAP) at Government Post Graduate College of Science, Faisalabad.

Dr. Kuldeep Pareta

Professor & Head, Department of Remote Sensing/GIS & NRM, B-30 Kailash Colony, New Delhi 110 048, India

Dr. Th. Kiranbala Devi

Associate Professor, Department of Civil Engineering, Manipur Institute of Technology, Takyelpat, Imphal, Manipur, India

Dr. Nirmala Mungamuru

Associate Professor, Department of Computing, School of Engineering, Adama Science and Technology University, Ethiopia

Dr. Srilalitha Giriya Kumari Sagi

Associate Professor, Department of Management, Gandhi Institute of Technology and Management, India

Dr. Vishnu Narayan Mishra

Associate Professor, Department of Mathematics, Sardar Vallabhbhai National Institute of Technology, Ichchhanath Mahadev Dumas Road, Surat (Gujarat), India

Dr. Yash Pal Singh

Director/Principal, Somany (P.G.) Institute of Technology & Management, Garhi Bolni Road, Rewari Haryana, India.

Dr. Sripada Rama Sree

Vice Principal, Associate Professor, Department of Computer Science and Engineering, Aditya Engineering College, Surampalem, Andhra Pradesh. India.

Dr. Rustom Mamlook

Associate Professor, Department of Electrical and Computer Engineering, Dhofar University, Salalah, Oman. Middle East.

Managing Editor

Mr. Jitendra Kumar Sen

International Journal of Advanced Engineering and Nano Technology (IJAENT)

Editorial Board

Dr. Saeed Balochian

Associate Professor, Gonaabad Branch, Islamic Azad University, Gonabad, Iratan

Dr. Mongey Ram

Associate Professor, Department of Mathematics, Graphics Era University, Dehradun, India

Dr. Arupratan Santra

Sr. Project Manager, Infosys Technologies Ltd, Hyderabad (A.P.)-500005, India

Dr. Ashish Jolly

Dean, Department of Computer Applications, Guru Nanak Khalsa Institute & Management Studies, Yamuna Nagar (Haryana), India

Dr. Israel Gonzalez Carrasco

Associate Professor, Department of Computer Science, Universidad Carlos III de Madrid, Leganes, Madrid, Spain

Dr. Guoxiang Liu

Member of IEEE, University of North Dakota, Grand Forks, N.D., USA

Dr. Khushali Menaria

Associate Professor, Department of Bio-Informatics, Maulana Azad National Institute of Technology (MANIT), Bhopal (M.P.), India

Dr. R. Sukumar

Professor, Sethu Institute of Technology, Pulloor, Kariapatti, Virudhunagar, Tamilnadu, India

Dr. Cherouat Abel

Professor, University of Technology of Troyes, France

Dr. Rinkle Aggrawal

Associate Professor, Department of Computer Science and Engineering, Thapar University, Patiala (Punjab), India

Dr. Parteek Bhatia

Associate Professor, Department of Computer Science & Engineering, Thapar University, Patiala (Punjab), India

Dr. Manish Srivastava

Professor & Head, Computer Science and Engineering, Guru Ghasidas Central University, Bilaspur (C.G.), India



S. No	Volume-2 Issue-1, December 2014, ISSN: 2347-6389 (Online) Published By: Blue Eyes Intelligence Engineering & Sciences Publication Pvt. Ltd.		Page No.
	Authors:	Jamal O. Sameer, Omar S. Zaroog, Samer F., Abdulbasit Abdullah	
	Paper Title:	A Numerical Comparison between Aluminum Alloy and Mild Steel in Order to Enhance the Energy Absorption Capacity of the Thin Walled Tubes	
1.	<p>Abstract: The current study describes and comparison between the behavior of the thin wall rectangular tube cross- sections modeled by mild steel and aluminum alloy, subjected to dynamic compression load. We examine the reaction of the tube of various thicknesses and materials (mild steel A36 and aluminium alloy AA6060), subjected to direct and oblique loading. The study investigates the behavior of the rectangular tube, with various weights of various hollow aluminum foam. The choice of the best design of tube parameter is based on the method called multi criteria decision making (MCDM). The examined criterions are the peak force, crush force efficiency (CFE), how also the energy absorption in case of oblique and direct load. The optimal choice of the rectangular tube is the aluminium rectangular profile of 3.4 mm thickness and hollow aluminium foam type (E= 0.652Kg), under oblique load, with enhancement of the energy absorption of 11.2 %, an improvement of CFE by 42.3%, decrease of peak force by 30.7 %. In case the direct load, the enhancement of the energy absorption of 7.2 %, an improvement of CFE by 88%, decrease of peak force by 39.7 %. The aim of using thinner tube and hollow aluminium foam is to keep the final design the lowest possible weight, to improve the CFE and the energy absorber capacities in order to attain higher passenger safety.</p> <p>Keywords: Aluminum alloy, mild steel, dynamic compression, thin wall, energy absorption, aluminum foam.</p> <p>References:</p> <ol style="list-style-type: none"> Abramowicz, W., & Wierzbicki, T. (1988). Axial crushing of foam-filled columns. <i>International Journal of Mechanical Sciences</i>, 30(3), 263-271. Abramowicz, W., & Wierzbicki, T. (1989). Axial crushing of multicorner sheet metal columns. <i>Journal of Applied Mechanics</i>, 56(1), 113-120. Aktay, L., Toksoy, A. K., & Güden, M. (2006). Quasi-static axial crushing of extruded polystyrene foam-filled thin-walled aluminum tubes: experimental and numerical analysis. <i>Materials & design</i>, 27(7), 556-565. Chen, W., & Wierzbicki, T. (2001). Relative merits of single-cell, multi-cell and foam-filled thin-walled structures in energy absorption. <i>Thin-Walled Structures</i>, 39(4), 287-306. Hanssen, A. G., Hopperstad, O. S., Langseth, M., & Ilstad, H. (2002). Validation of constitutive models applicable to aluminium foams. <i>International journal of mechanical sciences</i>, 44(2), 359-406. Kavi, H., Toksoy, A. K., & Guden, M. (2006). Predicting energy absorption in a foam -filled thin-walled aluminum tube based on experimentally determined strengthening coefficient. <i>Materials & design</i>, 27(4), 263-269. Kim, H. S. (2002). New extruded multi-cell aluminum profile for maximum crash energy absorption and weight efficiency. <i>Thin-Walled Structures</i>, 40(4), 311-327. Santosa, S., & Wierzbicki, T. (1999). Effect of an ultralight metal filler on the bending collapse behavior of thin-walled prismatic columns. <i>International Journal of Mechanical Sciences</i>, 41(8), 995-1019. Seitzberger, M., Rammerstorfer, F. G., Gradinger, R., Degischer, H. P., Blaimschein, M., & Walch, C. (2000). Experimental studies on the quasi-static axial crushing of steel columns filled with aluminium foam. <i>International Journal of Solids and Structures</i>, 37(30), 4125-4147. Hanssen, A. G., Langseth, M., & Hopperstad, O. S. (1999). Static crushing of square aluminium extrusions with aluminium foam filler. <i>International Journal of Mechanical Sciences</i>, 41(8), 967-993. Hanssen, A. G., Hopperstad, O. S., & Langseth, M. (2000). Bending of square aluminium extrusions with aluminium foam filler. <i>Acta Mechanica</i>, 142(1-4), 13-31. Hanssen, A. G., Langseth, M., & Hopperstad, O. S. (2000). Static and dynamic crushing of square aluminium extrusions with aluminium foam filler. <i>International Journal of Impact Engineering</i>, 24(4), 347-383. Hanssen, A. G., Hopperstad, O. S., & Langseth, M. (2001). Design of aluminium foam-filled crash boxes of square and circular cross-sections. <i>International Journal of Crashworthiness</i>, 6(2), 177-188. Hanssen, A. G., Langseth, M., & Hopperstad, O. S. (2001). Optimum design for energy absorption of square aluminium columns with aluminium foam filler. <i>International Journal of Mechanical Sciences</i>, 43(1), 153-176. Song, H. W., Fan, Z. J., Yu, G., Wang, Q. C., & Tobota, A. (2005). Partition energy absorption of axially crushed aluminum foam-filled hat sections. <i>International Journal of Solids and Structures</i>, 42(9), 2575-2600. Chen, W. (2001). Optimisation for minimum weight of foam-filled tubes under large twisting rotation. <i>International Journal of Crashworthiness</i>, 6(2), 223-242. Chen, W., Wierzbicki, T., & Santosa, S. (2002). Bending collapse of thin-walled beams with ultralight filler: numerical simulation and weight optimization. <i>Acta mechanica</i>, 153(3-4), 183-206. Nariman-Zadeh, N., Darvizeh, A., & Jamali, A. (2006). Pareto optimization of energy absorption of square aluminium columns using multi-objective genetic algorithms. <i>Proceedings of the Institution of Mechanical Engineers , Part B: Journal of Engineering Manufacture</i>, 220(2), 213-224. Zarei, H. R., & Kröger, M. (2007). Crashworthiness optimization of empty and filled aluminum crash boxes. <i>International Journal of Crashworthiness</i>, 12(3), 255-264. Zarei, H., & Kröger, M. (2008). Optimum honeycomb filled crash absorber design. <i>Materials & Design</i>, 29(1), 193-204. F. Tarlochan and Samer F. (2013). Design of thin wall structures for energy absorption applications: design for crash injuries mitigation using magnesium alloy. <i>IJRET</i>. 2 – (07)- 2319-1163. Cheng, Q., Altenhof, W., & Li, L. (2006). Experimental investigations of the crush behavior of AA6061-T6 aluminum square tubes with different types of through-hole discontinuities. <i>Thin-walled structures</i>, 44 (4), 441-454. Harte, A. M., Fleck, N. A., & Ashby, M. F. (2000). Energy absorption of foam-filled circular tubes with braided composite walls. <i>European Journal of Mechanics-A/Solids</i>, 19 (1), 31-50. Olabi, A. G., Morris, E., Hashmi, M. S. J., & Gilchrist, M. D. (2008). Optimized design of nested circular tube energy absorbers under lateral impact loading. <i>International Journal of Mechanical Sciences</i>, 50 (1), 104-116. Ahmad, Z., & Thambiratnam, D. P. (2009). Dynamic computer simulation and energy absorption of foam -filled conical tubes under axial impact loading. <i>Computers & Structures</i>, 87 (3), 186-197. Nagel, G. (2005). Impact and energy absorption of straight and tapered rectangular tubes (Doctoral dissertation, Queensland 		1-12

University of Technology).

27. Nagel, G. M., & Thambiratnam, D. P. (2005). Computer simulation and energy absorption of tapered thin-walled rectangular tubes. *Thin-Walled Structures*, 43 (8), 1225-1242.
28. Witteman, W. J. (1999). Improved vehicle crashworthiness design by control of the energy absorption for different collision situations: proefschrift. Technische Universiteit Eindhoven
29. Dehghan-Manshadi, B., Mahmudi, H., Abedian, A., & Mahmudi, R. (2007). A novel method for materials selection in mechanical design: combination of non-linear normalization and a modified digital logic method. *Materials & design*, 28(1), 8-15.
30. Olabi, A. G., Morris, E., Hashmi, M. S. J., & Gilchrist, M. D. (2008). Optimised design of nested circular tube energy absorbers under lateral impact loading. *International Journal of Mechanical Sciences*, 50(1), 104-116.
31. Witteman, W. J. (1999). Improved vehicle crashworthiness design by control of the energy absorption for different collision situations: proefschrift. Technische Universiteit Eindhoven
32. Ahmad, Z., & Thambiratnam, D. P. (2009). Dynamic computer simulation and energy absorption of foam-filled conical tubes under axial impact loading. *Computers & Structures*, 87(3), 186-197.
33. Duan, C. Z., Dou, T., Cai, Y. J., & Li, Y. Y. (2011). Finite element simulation and experiment of chip formation process during high speed machining of AISI 1045 hardened steel. *AMAE International Journal on Production and Industrial Engineering*, 2(1).
34. Dean, J., Dunleavy, C. S., Brown, P. M., & Clyne, T. W. (2009). Energy absorption during projectile perforation of thin steel plates and the kinetic energy of ejected fragments. *International journal of impact engineering*, 36(10), 1250-1258.
35. Lacy, J. M., Shelley, J. K., Weathersby, J. H., Daehn, G. S., Johnson, J., & Taber, G. (2010, October). Optimization-based constitutive parameter identification from Sparse Taylor cylinder data. In *Proceedings of the 81st shock and vibration symposium*. Idaho National Laboratory, US.
36. Deshpande, V. S., & Fleck, N. A. (2000). Isotropic constitutive models for metallic foams. *Journal of the Mechanics and Physics of Solids*, 48(6), 1253-1283.
37. Shahbeyk, S., Petrinic, N., & Vafai, A. (2007). Numerical modelling of dynamically loaded metal foam-filled square columns. *International journal of impact engineering*, 34(3), 573-586.
38. Ahmad, Z., & Thambiratnam, D. P. (2009). Dynamic computer simulation and energy absorption of foam-filled conical tubes under axial impact loading. *Computers & Structures*, 87(3), 186-197.
39. Reyes, A., Hopperstad, O. S., Berstad, T., Hanssen, A. G., & Langseth, M. (2003). Constitutive modeling of aluminum foam including fracture and statistical variation of density. *European Journal of Mechanics-A/Solids*, 22(6), 815-835.
40. Tarlochan, F., Samer, F., Hamouda, A. M. S., Ramesh, S., & Khalid, K. (2013). Design of thin wall structures for energy absorption applications: Enhancement of crashworthiness due to axial and oblique impact forces. *Thin-Walled Structures*, 71, 7-17.
41. Jensen, Ø., Langseth, M., & Hopperstad, O. S. (2004). Experimental investigations on the behaviour of short to long square aluminium tubes subjected to axial loading. *International Journal of Impact Engineering*, 30(8), 973-1003.

Authors: Eman Alzahrani

Paper Title: Fabrication of Monolithic Silica Microchip for Efficient DNA Purification

Abstract: The demand for high purity deoxyribonucleic acid (DNA) is still increasing. The aim of this work is to fabricate a microchip that has the ability to preconcentrate DNA from biological samples with a high extraction efficiency compared to commercial DNA extraction kits. This was achieved by fabrication of monolithic materials, followed by placing the monolithic silica disk inside the extraction chamber of the polycarbonate microchip. The formation of the mesopores on the silica skeleton was achieved by treating the monolithic silica rod, using different concentrations of aqueous ammonia solution, mainly 0M, 1M, 5M, and 7M, while all other parameters involved in the fabrication of the monolithic silica rods were kept identical. The fabricated materials were studied using EDAX analysis, TEM analysis, and the SEM analysis. Based on the results, 5 M ammonia solution was chosen for optimisation of fabrication of silica-based monolith. Moreover, the benefit of integrating solid-phase nucleic acid extraction techniques into a microfluidic system was to get highly efficient isolation of target analytes due to beneficial surface area characteristics. In this study, isolation of nucleic acids from mouse liver was achieved using a silica-based monolith, onto which nucleic acids were adsorbed onto a solid support; the residual biological matrix and any exogenous contaminants were then removed by washing the monolithic materials with 80% ethanol, and finally the purified DNA was eluted from the microchip using 200 µL of 10 mM tris-EDTA buffer solution (pH 8.5). The data showed that the UV absorption ratio of A260/A230 was 1.75 ± 0.05 and the absorbance ratio of A260/A280 was 1.70 ± 0.04 for the fabricated microchip, showing a good degree of purity. It would be interesting to investigate the use of the fabricated microchip for purification of DNA from forensic samples.

Keywords: Deoxyribonucleic acid (DNA); extraction method; monolithic materials; polycarbonate microchip; sol-gel method.

References:

1. Bieber, F.R., Science and technology of forensic DNA profiling: current use and future directions. *DNA and the Criminal Justice System: The Technology of Justice*, 2004: p. 23-62.
2. Urthaler, J., et al., Application of monoliths for plasmid DNA purification: development and transfer to production. *Journal of Chromatography A*, 2005. 1065(1): p. 93-106.
3. Paegel, B.M., R.G. Blazej, and R.A. Mathies, Microfluidic devices for DNA sequencing: sample preparation and electrophoretic analysis. *Current opinion in biotechnology*, 2003. 14(1): p. 42-50.
4. Butler, J.M., *Forensic DNA typing: biology, technology, and genetics of STR markers*. 2005: Academic Press.
5. Kashkary, L., et al., Improved DNA extraction efficiency from low level cell numbers using a silica monolith based microfluidic device. *Analytica chimica acta*, 2012. 750: p. 127-131.
6. Shaw, K.J., et al., The use of carrier RNA to enhance DNA extraction from microfluidic-based silica monoliths. *Analytica chimica acta*, 2009. 652(1): p. 231-233.
7. Aurox, P., et al., Miniaturised nucleic acid analysis. *Lab on a Chip*, 2004. 4(6): p. 534-546.
8. Freire-Aradas, A., et al., A new SNP assay for identification of highly degraded human DNA. *Forensic Science International: Genetics*, 2012. 6(3): p. 341-349.
9. Nováková, L. and H. Vlčková, A review of current trends and advances in modern bio-analytical methods:

	<p>Chromatography and sample preparation. <i>Analytica Chimica Acta</i>, 2009. 656(1): p. 8-35.</p> <ol style="list-style-type: none"> 10. Żwir-Ferenc, A. and M. Biziuk, Solid phase extraction technique—trends, opportunities and applications. <i>Polish Journal of Environmental Studies</i>, 2006. 15(5): p. 677-690. 11. Sabik, H., R. Jeannot, and B. Rondeau, Multiresidue methods using solid-phase extraction techniques for monitoring priority pesticides, including triazines and degradation products, in ground and surface waters. <i>Journal of Chromatography A</i>, 2000. 885(1): p. 217-236. 12. Vas, G. and K. Vekey, Solid-phase microextraction: a powerful sample preparation tool prior to mass spectrometric analysis. <i>Journal of mass spectrometry</i>, 2004. 39(3): p. 233-254. 13. Alzahrani, E. and K. Welham, Fabrication of an octadecylated silica monolith inside a glass microchip for protein enrichment. <i>Analyst</i>, 2012. 137(20): p. 4751-4759. 14. Alzahrani, E. and K. Welham, Design and evaluation of synthetic silica-based monolithic materials in shrinkable tube for efficient protein extraction. <i>Analyst</i>, 2011. 136(20): p. 4321-4327. 15. Alzahrani, E. and K. Welham, Fabrication of a TCEP-immobilised monolithic silica microchip for reduction of disulphide bonds in proteins. <i>Analytical Methods</i>, 2014. 6(2): p. 558-568. 16. Simpson, N.J., <i>Solid-phase extraction: principles, techniques, and applications</i>. 2000: CRC Press. 17. Moein, M.M., et al., Solid phase microextraction and related techniques for drugs in biological samples. <i>Journal of analytical methods in chemistry</i>, 2014. 2014(1): p. 1-24. 18. Tennikova, T.B. and F. Svec, High-performance membrane chromatography: highly efficient separation method for proteins in ion-exchange, hydrophobic interaction and reversed-phase modes. <i>Journal of Chromatography A</i>, 1993. 646(2): p. 279-288. 19. Svec, F. and J.M. Fréchet, Modified poly (glycidyl methacrylate-co-ethylene dimethacrylate) continuous rod columns for preparative-scale ion-exchange chromatography of proteins. <i>Journal of Chromatography A</i>, 1995. 702(1): p. 89-95. 20. Zöchling, A., et al., Mass transfer characteristics of plasmids in monoliths. <i>Journal of separation science</i>, 2004. 27(10): p. 819-827. 21. Štrancar, A., et al., Application of compact porous disks for fast separations of biopolymers and in-process control in biotechnology. <i>Analytical chemistry</i>, 1996. 68(19): p. 3483-3488. 22. Podgornik, A., et al., Construction of large-volume monolithic columns. <i>Analytical chemistry</i>, 2000. 72(22): p. 5693-5699. 23. Josic, D., A. Buchacher, and A. Jungbauer, Monoliths as stationary phases for separation of proteins and polynucleotides and enzymatic conversion. <i>Journal of Chromatography B: Biomedical Sciences and Applications</i>, 2001. 752(2): p. 191-205. 24. Plieva, F.M., et al., Characterization of polyacrylamide based monolithic columns. <i>Journal of separation science</i>, 2004. 27(10): p. 828-836. 25. Svec, F. and J.M. Fréchet, Continuous rods of macroporous polymer as high-performance liquid chromatography separation media. <i>Analytical Chemistry</i>, 1992. 64(7): p. 820-822. 26. Svec, F. and A.A. Kurganov, Less common applications of monoliths: III. Gas chromatography. <i>Journal of Chromatography A</i>, 2008. 1184(1): p. 281-295. 27. Wang, S., et al., A low-density DNA microchip for the detection of (anti-) estrogenic compounds and their relative potencies. <i>Analytical biochemistry</i>, 2013. 435(1): p. 83-92. 28. Nakagawa, T., et al., Fabrication of amino silane-coated microchip for DNA extraction from whole blood. <i>Journal of biotechnology</i>, 2005. 116(2): p. 105-111. 29. Lion, N., et al., Microfluidic systems in proteomics. <i>Electrophoresis</i>, 2003. 24(21): p. 3533-3562. 30. Yang, Y., et al., Coupling on-chip solid-phase extraction to electrospray mass spectrometry through an integrated electrospray tip. <i>Electrophoresis</i>, 2005. 26(19): p. 3622-3630. 31. Erickson, D. and D. Li, Integrated microfluidic devices. <i>Analytica Chimica Acta</i>, 2004. 507(1): p. 11-26. 32. Nakanishi, K. and N. Tanaka, Sol-gel with phase separation. Hierarchically porous materials optimized for high-performance liquid chromatography separations. <i>Accounts of chemical research</i>, 2007. 40(9): p. 863-873. 33. Nakanishi, K., Pore structure control of silica gels based on phase separation. <i>Journal of Porous Materials</i>, 1997. 4(2): p. 67-112. 34. Alzahrani, E. and K. Welham, Preconcentration of milk proteins using octadecylated monolithic silica microchip. <i>Analytica chimica acta</i>, 2013. 798: p. 40-47. 					
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Authors:</td> <td>Neelam Hazoor Zaidi</td> </tr> <tr> <td>Paper Title:</td> <td>Synthesis and Characterization of Semiconductor Nanocrystals: Photoluminescence and Size Tunability</td> </tr> </table>	Authors:	Neelam Hazoor Zaidi	Paper Title:	Synthesis and Characterization of Semiconductor Nanocrystals: Photoluminescence and Size Tunability	
Authors:	Neelam Hazoor Zaidi					
Paper Title:	Synthesis and Characterization of Semiconductor Nanocrystals: Photoluminescence and Size Tunability					
3.	<p>Abstract: Semiconductor nanoparticles are presently of great interest for their practical applications such as zero-dimensional quantum confined materials and for their applications in optoelectronics and photonics. The optical properties get modified dramatically due to the confinement of charge carriers within the nanoparticles. Similar to the effects of charge carriers on optical properties, confinement of optical and acoustic phonons leads to interesting changes in the phonon spectra. In the present work, we have synthesized nanoparticles of CdSe using thermal decomposition technique. Transmission electron Microscopy (TEM), Absorption spectroscopy and fluorescence spectroscopy have been used for characterization. Under room temperature condition highly luminescent particles emit in visible region, can be synthesized. Broadening of this photoluminescence spectra is due to the defects such as vacancies, which are probably located close to the surface in case of nanoparticles.</p> <p>Keywords: Nanoparticles, optical properties, photoluminescence.</p> <p>References:</p> <ol style="list-style-type: none"> 1. Andrew, M. Smith.; Shuming, Nie.; <i>accounts of chemical research</i> 2001, 43, 190. 2. Norris.; David J.; Efros.; Alexander L.; Erwin. Steven C; <i>Science</i>. 2008, 319, 1776. 3. Li.J. Jack; Yang, Y.Andrew; Peng; Xiaogang; <i>J. Am. Chem. Soc.</i> 2003, 125, 12567. 4. Whitesides G M.; Grzybowski B; <i>Science</i> 2002,295, 2418. 5. Brus, L. E.; <i>J. Chem.. Phys</i> 1984, 80, 4403. 6. Alivistos A. P.; <i>Science</i> 1996, 271, 933. 7. Mikulec.; Frederic V.; Kuno, Masaru; Bawendi; <i>J. Am. Chem. Soc.</i> 2000, 122, 2532. 8. Deng, Zhengtao.; Cao, Li; Tang; <i>J. Phys .Chem. B.</i> 2005, 109, 16671. 9. Y. S. Wang.; P. John Thomas.; P. O'Brien ; <i>J. Phys. Chem.</i> 2006, 110, 21412. 10. Gaponenko S V.; <i>Optical properties of semi conductor nanocrystals.</i> Cambridge University Press,Cambridge(UK),1998. 	19-21				

	Authors:	G. N. Rameshaiah, Y. K. Suneetha	
	Paper Title:	Enzymatic Depolymerization of Nano Chitin Particles into N-Acetylglucosamine	
4.		<p>Abstract: Chitin is a crystalline polysaccharide widely spread in nature with three structures: alpha, beta and gamma chitins. Chitin is gaining importance for their biotechnological applications. Enzymatic depolymerisation of chitin to produce oligomers was carried out using the filamentous fungi <i>Trichoderma harzianum</i> (MTCC 3928). The bioprocess offers many advantages and helps to overcome the limitations of conventional chemical treatment which is presently used in industries. Chitin is treated with hydrochloric acid for chitin demineralization and to obtain colloidal nano size particles. Production of N-acetyl glucosamine was studied as a function of acid washed chitin in the particle size range of 74-125µm, pH of the broth media, and concentration of chitin and trace nutrients. N-acetylglucosamine yield was highest with particles of 125 µm size at solution pH5 and when incubated at 34°C for 120 h in an orbital shaker with 160 revolutions per minute. Higher yield was obtained with initial chitin concentration of 10 g/L and lowered yield may be due to diffusion resistances and substrate inhibition at other concentrations. Trace nutrient concentration has an impact on both enzyme activity and product yield.</p> <p>Keywords: <i>Trichoderma harzianum</i>, Chitin, N-acetylglucosamine.</p> <p>References:</p> <ol style="list-style-type: none"> Muzzarelli, RAA. Chitin. Oxford: Pergamon Press, 1977. Muzzarelli, RAA, Ilari P, Tarsi R, Dubini B, Xia W. Chitosan from Absidiacoerulea. <i>CarbohydrPolym</i> 1994;25:45–50. Subasinghe S. The development of crustacean and mollusc industries for chitin and chitosan resources. In: Zakaria MB, Wan Muda WM, Abdullah MP, editors. Chitin and Chitosan. Malaysia: PenerbitUniversitiKebangsaan, 1995. p. 27–34. Willem F Stevens, “Production of Chitin and Chitosan: Refinement and Sustainability of Chemical and Biological Processing”, Cirano J. Ulhoa and John F. Peberdy “Regulation of chitinase synthesis in <i>Trichoderma harzianum</i>.”, <i>J. Gen. Microbiol.</i>,1991,2163-2169,137. Kapat A, S K Rakshit, Panda T , “ Parameter optimization of chitin hydrolysis by <i>Trichoderma harzianum</i> chitinase under assay conditions”, <i>Bioprocess Engineering</i> 14(1996) 275-279 Laura Ramirez-Coutino, Maria del Carmen Marin-Cervantes, Sergio Huerta, Sergio Revah, Keiko Shirai, Enzymatic hydrolysis of chitin in the production of oligosaccharides using <i>Lecanicillium fungicola</i> chitinases, <i>Process Biochemistry</i> 41 (2006) 1106–1110 Patil R.S., Ghormade V., Deshpande M.V., Chitinolytic enzymes: an exploration, <i>Enzyme Microb. Technol.</i>,1999, 473–483,26. Gooday GW. Diversity of roles for chitinases in nature. In: Zakaria MB, Wan Muda WM, Abdullah MP, editors. Chitin and Chitosan. Malaysia: PenerbitUniversitiKebangsaan, 1995. p. 191–202. Zikakis JP. Chitinolytic enzymes and their applications. In: Whitaker JR, Sonnet PE, editors. Biocatalysts in Agricultural Biotechnology, ACS Symposium Series 389. Washington, DC: American Chemical Society, 1989. p. 116–26. Kombrink E, Somssich IE. Defense responses of plants to pathogens. <i>Adv Bot Res</i> 1995;21:2–34. Flach J, Pilet P-E, Jolles P. What’s new in chitinase research. <i>Experientia</i> 1992;48:701–16. Kramer KJ, Muthukrishnan S. Insect chitinases: molecular biology and potential use as biopesticides. <i>Insect BiochemMolBiol</i> 1997; 27:887–900. Sahai AS, Manocha MS. Chitinases of fungi and plants: their involvement in morphogenesis and host-parasite interaction. <i>FEMSMicrobiol Rev</i> 1993;11:317–38. Felse, P. A. , and Panda, T., Studies on applications of chitin and its derivatives , <i>J. Bioprocess engg.</i> , 20 (1999)505-512 Miller, G. L., Use of dinitrosalicylic acid reagent for determination of reducing sugar, <i>Anal. Chem.</i> 1959, 31, 426-428 Kapat A, S K Rakshit, Panda T , “ Parameter optimization of chitin hydrolysis by <i>Trichoderma harzianum</i> chitinase under assay conditions”, <i>Bioprocess Engineering</i> 14(1996) 275-279 JL Reissig; JL Strominger; IF Leoloir. <i>J. Biol. Chem.</i>, 1955, 217, 959-966. AshwiniNarasimhan, Srividyaashivakumar. <i>Eur. J. Exp. Biol.</i>, 2012, 2(4), 861-865. Miller, G. L., Use of dinitrosalicylic acid reagent for determination of reducing sugar, <i>Anal. Chem.</i> 1959, 31, 426-428 Lowry, O.H., Rosebrough, N.J., Farr, A.L., and Randall, R.J. (1951) <i>J.Biol.Chem</i> 193: 265. K. Burton, “A study of the conditions and mechanism of the diphenylamine reaction for the colorimetric estimation of deoxyribonucleic acid,” <i>The Biochemical Journal</i>, vol. 62, no. 2, pp. 315–323, 1956 	22-28