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Authors:	**Jamal O. Sameer, Omar S. Zaroog, Samer F., Abdulbasit Abdullah**	
Paper Title:	**A Numerical Comparison between Aluminuim Alloy and Mild Steel in Order to Enhance the Energy Absorption Capacity of the Thin Walled Tubes**	

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.

Keywords: Aluminum alloy, mild steel, dynamic compression, thin wall, energy absorption, aluminum foam.

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2.

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.

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3.

Authors: **Neelam Hazoor Zaidi**

Paper Title: **Synthesis and Characterization of Semiconductor Nanocrystals: Photoluminescence and Size Tunability**

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.

Keywords: Nanoparticles, optical properties, photoluminescence.

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4.	**Authors:**	**G. N. Rameshaiah, Y. K. Suneetha**	**22-28**
	Paper Title:	**Enzymatic Depolymerization of Nano Chitin Particles into N-Acetylglucosamine**	

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 Trichoderma harzianum (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℃ 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.

Keywords: Trichoderma harzianum, Chitin, N-acetylglucosamine.

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