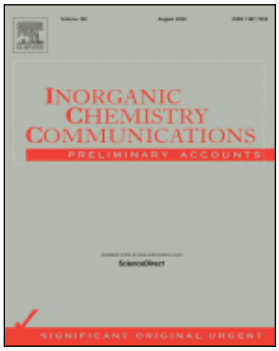
Journal Name: Inorganic Chemistry Communications **IF: 5.9**

Title: Stir-controlled differential binding of folic acid in hollow silver nanocubes and the PERS enhancement in pre- and post-saturation regimes

Author: Gupta P.; Dadhich B.K.; Patra S.K.; Bhushan B.; Priyam A.

Details: Volume 191, Issue P1, September 2026

Abstract: The chemical identity of the biomolecules on nanostructured substrates is not only defined by plasmon-enhanced Raman spectroscopy (PERS) but also by the nature of the plasmon resonance that is facilitated by the substrate. In this case, we show that the rate of the stirring in the course of the synthesis regulates the sharpness of the corners of hollow silver nanocubes (HAgNCs) that determines the excitation of either the dipolar or both the dipolar and quadrupolar surface plasmon resonances with direct and molecularly specific implications on the PERS of the adsorbed folic acid (FA) capping agent of the hollow silver nanocube.. The transmission electron microscopy proves that both samples produce hollow cubic nanoparticles with similar edge lengths (around 78–79 nm) and void diameters, and the edge of critical morphological distinction is the much sharper corners in HAgNCs-Zero. Second-derivative analysis of UV–Vis extinction spectroscopy shows that HAgNCs-Zero only supports dipolar plasmon modes. Meanwhile, HAgNCs-150, alone, has an extra quadrupolar resonance at 430 nm, the higher-order plasmon mode, which has not been reported in hollow silver nanocubes. Correlatively, PERS measurements reveal that the symmetric and asymmetric NH folic acid vibrations of folic acid at 3200 and 3400 cm−1 are present only in the spectrum of HAgNCs-Zero, the first-ever NH folic acid modes to be observed in any SERS or PERS of folic acid on any substrate. These results provide a direct mechanistic pathway between the synthesis environment to corner geometry, plasmon mode hierarchy, molecular binding orientation, and selective vibrational enhancement to provide new understanding on the rational design of morphology-controlled PERS substrate for bioanalytical applications.



URL: https://www.sciencedirect.com/science/article/pii/S1387700326008580?via%3Dihub

SCHOLARLY PUBLICATIONS
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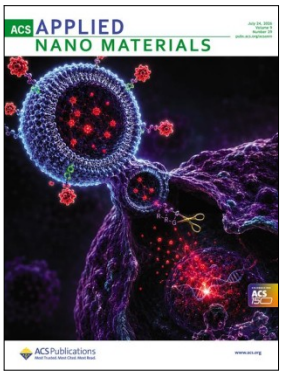
Journal Name: ACS Applied Nano Materials **IF: 5.8**

Title: Experimental and Theoretical Investigation on Ta-DopedNiTe Nanorods for Nonlinear Optical Applications

Author: Supriya, S; Wakodkar, DM; Sahoo, JK; Kumar, J; Pradhan, M; Naik, R

Details: Volume-9, Issue-29, 24th July, 2026

Abstract: NiTe-based nanomaterials have attracted considerable attention for a wide range of technological applications due to their favorable physicochemical properties and compositional flexibility. In this study, a series of four Ta-incorporated NiTe (NT) nanostructures was successfully prepared using a single-step hydrothermal synthesis approach to systematically examine the effect of Ta addition on their structural, optical, and optoelectronic characteristics. X-ray diffraction (XRD) results confirmed the formation of the hexagonal NiTe crystal structure, with a noticeable increase in crystallite size from 16.062 to 21.138 nm upon Ta incorporation. Raman spectral analysis confirmed the presence of characteristic lattice vibration modes, while X-ray photoelectron spectroscopy (XPS) offered comprehensive information regarding elemental composition and oxidation states. Morphological observations from field-emission scanning electron microscopy (FESEM) demonstrated a distinct evolution from nanoparticle assemblies to nanorod-like architectures upon Ta doping. Optical absorption studies (UV–vis-NIR spectroscopy) revealed a systematic redshift in the direct band gap, decreasing from 2.91 to 2.37 eV with increasing Ta content. Moreover, nonlinear optical (NLO) investigations established the presence of reverse saturable absorption (RSA) behavior, as indicated by positive nonlinear absorption coefficients. The optical and electronic properties have also been studied theoretically. Collectively, these findings underscore the strong suitability of Ta-doped NiTe nanostructures for advanced optoelectronic applications, particularly in high-efficiency nonlinear optical devices.



URL:https://pubs.acs.org/aanmf6/article-abstract/9/29/13879/5207693/Experimental-and-Theoretical-Investigation-on-Ta?redirectedFrom=fulltext

SCHOLARLY PUBLICATIONS
School of Applied Sciences
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Journal Name: Materials Advances **IF: 5.8**

Title: Bridging energy conversion and storage: precursor-engineered Co@CoO–Y2O3 heterostructures for oxygen reduction reaction and battery-type supercapacitor applications

Author: Samanta S.B.; Roy S.; Palit S.; Bharatbhai J.A.; Barik N.; Mo H.; Lee J.; Giri S.; Das S.

Details: Volume 7, Issue 12, June 2026

Abstract: The escalating consumption of fossil fuels and the intermittency of renewable power have intensified the need for multifunctional electrochemical materials that can couple efficient energy conversion and durable energy storage while avoiding device-level complexity and reliance on Pt. Herein, we report a non-noble metal-based Co@CoO–Y_2O_3 (CCY) heterostructured composite synthesized via the pyrolysis of a well-defined cobalt–yttrium single-crystal precursor complex. In alkaline media (1 M KOH), CCY demonstrates competitive oxygen reduction reaction (ORR) activity, delivering a half-wave potential of 0.603 V (vs. RHE), an onset potential of 0.79 V, and stable operation for over 24 h. Koutecky–Levich analysis indicates a predominantly two-electron ORR pathway with high peroxide selectivity, highlighting its suitability for non-Pt catalytic systems. Simultaneously, when employed as a battery-type supercapacitor electrode, CCY exhibited electrolyte-dependent faradaic charge storage, achieving specific capacitances of 22, 18.74, and 10.12 F g^{-1} at 0.1 A g^{-1} in KOH, NaOH, and LiOH electrolytes, respectively, along with a low charge-transfer resistance and ∼64.14% capacitance retention over 10 000 cycles. This study establishes a scalable, precursor-driven strategy for designing rare-earth-modified bifunctional materials for integrated energy conversion and storage applications.

URL: https://pubs.rsc.org/ma/article/7/12/6193/1225273/Bridging-energy-conversion-and-storage-precursor

SCHOLARLY PUBLICATIONS
School of Applied Sciences
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Journal Name: RSC Advances **IF: 6.1**

Title: Pulse sensor for cardiovascular health monitoring based on self-poled piezo-tribo hybrid composites

Author: Kumar S.; Nanda J.; Jacob S.K.; S S.; S P.; Pradhan G.K.; Mandal P.

Details: Volume-16, Issue-34, 22nd July, 2026

Abstract: Wearable devices, such as a pulse sensor, can be useful for real-time monitoring of cardiovascular health. Continuous and systematic monitoring of cardiovascular parameters can predict conditions such as coronary artery disease, heart failure, cardiac arrest, etc. However, most commercial wearable sensors are typically limited to macroscopic metrics such as heart rate and SpO_2. This work introduces a sensitive piezoelectric–triboelectric hybrid composite-based pulse sensor that provides insight into an individual's cardiovascular health by measuring heart rate variability (HRV) metrics, including heart rate, P–P intervals (the time between successive heartbeats), and RMSSD (the root mean square of successive differences between intervals). The high sensitivity of the sensor is rooted in a dual strategy: first, the piezoceramic $BaTi_{0.94}Sn_{0.06}O_3$ (BST6) is engineered at a morphotropic phase boundary, yielding an excellent piezoelectric coefficient of. Second, the device employs a layer-by-layer configuration incorporating a self-poling PDMS–MWCNT interfacial layer sandwiched between the PDMS–BST6 hybrid composite layers. This layered architecture facilitates self-poling by enhancing charge collection at the PDMS–MWCNT layer while suppressing recombination at the PDMS–BST6 hybrid composite layer. Further, Short-Time Fourier Transform (STFT) and Dynamic Time Warping (DTW) analyses of the recorded pulse wave suggest device stability over 100 days and evaluate heart condition. This study opens the scope for an IoT-enabled wearable system for long-term, real-time cardiovascular health monitoring and assessment.

URL:https://pubs.rsc.org/ra/article/16/34/33120/1273005/Pulse-sensor-for-cardiovascular-health-monitoring

SCHOLARLY PUBLICATIONS
School of Applied Sciences
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Journal Name: Scientific Reports **IF: 4.9**

Title: Design of a MWCNT integrated advanced ternary composite with dual functionality in energy storage and photo catalytic dye detoxification

Author: Pradhan D.; Biswal S.K.; Nayak N.; Singhal R.; Salim A.; Dash S.K.

Details: Volume 16, Issue 1, December 2026

Abstract: Polluted water harms human health and the planet's wellbeing alike. Tackling the global energy crisis driven by rapid economic expansion and our reliance on power hungry gadgets demands innovative clean energy storage solutions. This study developed a ternary heterojunction photocatalyst based on g-C_3N_4/TiO_2/MWCNTs studied their structural, optical, and morphological properties, the produced materials were thoroughly evaluated via XRD, FTIR, BET, UV-Vis DRS, PL, SEM, TEM, Raman, and XPS studies. The photocatalytic activity of the g-C_3N_4/TiO_2/MWCNTs nanocomposite was evaluated via the degradation of rhodamine B dye under solar light with various parameters, and the results revealed that the g-C_3N_4/TiO_2/MWCNTs nanocomposite had 99% degradation efficiency with Z scheme mechanism and outperformed the pristine g-C_3N_4 sheet and TiO_2, with approximately 1.3 and 1.4 folds higher degradation rates, respectively. The photodegradation process was followed by pseudo first-order kinetics with a rate constant of 0.0922 min^{-1}, resulting in a 2.36 and 3.16 fold increase compared to pristine catalysts. Electrochemical impedance spectroscopy revealed improved electrical conductivity, and cyclic voltammetry investigations revealed an outstanding specific capacitance of 1860 F/g at 30 mV/s nearly six times greater than that of pristine g-C_3N_4 (348 F/g).The remarkable photocatalytic performance and good electrochemical properties of the g-C_3N_4/TiO_2/MWCNTs heterojunction highlight its promise as a multifunctional material for environmental purification and energy storage applications.

URL: https://www.nature.com/articles/s41598-026-47268-1

SCHOLARLY PUBLICATIONS
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Journal Name: RSC Applied Interfaces **IF: 4.6**

Title: 2D nanomaterials: pioneering platforms for cancer theranostics

Author: Mishra A.; Tripathy J.

Details: 23rd June, 2026

Abstract: Two-dimensional (2D) materials, owing to their distinctive physicochemical properties, are increasingly prominent in biomedicine. These materials have been widely utilized in photothermal therapy, imaging, drug delivery, and many combined therapies. Owing to their unique characteristics, 2D nanoparticles deliver therapeutic effects through diverse mechanisms, demonstrating significant potential for clinical applications. This review highlights the development and biomedical applications of 2D nanomaterials. It begins by introducing the structures, biological functionalization, and properties of representative 2D nanomaterials with varying configurations, along with their associated biomedical uses. Next, it explores the capabilities of 2D nanomedicines in therapeutics, imaging, and drug delivery. Finally, challenges and prospects for the clinical translation of 2D nanomedicines are discussed.

URL:https://pubs.rsc.org/lf/article/doi/10.1039/d6lf00017g/1266164/2D-nanomaterials-pioneering-platforms-for-cancer

SCHOLARLY PUBLICATIONS
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Journal Name: Physics and Chemistry of the Earth **IF: 4.6**

Title: Hidden particles: Abundance, chemical characteristics, metal binding properties, and environmental risk of microplastics in the downstream of riverine sediment-water ecosystems

Author: Mahapatra S.; Maity J.P.; Singha S.; Mishra T.; Mangal S.; Dey G.; Sharma R.K.; Banerjee P.; Bhattacharya P.

Details: Volume 144, October 2026

Abstract: Microplastics (MPs) pollution is a global problem in the current decade due to its contamination, persistence, and risks to ecosystems. The present study aims to investigate the 'occurrence and distribution', physiochemical characteristics, metal binding with MPs, and their environmental risk in the downstream of the riverine ecosystem (water and sediment/soil). The MPs were observed in the range of 50-5000 µm, with a higher abundance in sediment (1356 ± 13 particles/kg) compared to water (582 ± 12 particles/m^3), where the sediments have the potential to act as long-term sinks for MPs. The 'transparent/white color' and 'fragments/fibers' MPs were dominant in both water and sediment. Chemically, the polypropylene (PP) had the highest abundance (Water: 55.56 ± 2%, Sediment: 57.45 ± 3%) compared to polyethylene (PE) polyethylene terephthalate (PET), and polystyrene (PS) in the riverine ecosystem. All MPs are partially weathered (surface roughness/cracks and degradation), and several elements (e.g., As, Cd, Al, etc.) are attached to the MPs surface, suggesting anthropogenic activities as significant contributors. The overall study provides a comprehensive baseline of MPs pollution and risk in the river system, as well as MPs-metal interactions in the aquatic ecosystem, which can help to take proper monitoring strategies and mitigation of plastic-related ecological threats at both regional and global scales, particularly in riverine ecosystems as per SDG-3, 6, 12, and 14.

URL: https://www.sciencedirect.com/science/article/abs/pii/S1474706526002627?via%3Dihub

SCHOLARLY PUBLICATIONS
School of Applied Sciences
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Journal Name: Radiation Physics and Chemistry **IF: 4.3**

Title: Elemental, morphological and radiation-protective nature of selected low-cost construction materials: Experimental, theoretical and PHITS simulation

Author: Upadhyay D.R.; Khatiwada L.N.; Sunar R.; Praharaj S.; Rout D.; Khanal R.

Details: Volume 244, July 2026

Abstract: The ionizing radiation protective nature at different ranges of energy becomes important in materials. The prime objectives of this work are to investigate density, porosity, elemental, minerological, morphological and radiation shielding properties of low cost construction materials (CM). For this seven varieties of CM are experimentally analyzed using Archimedes principle, energy dispersive X-ray fluorescence, FESEM-EDS, powder X-ray diffraction, theoretical and simulation methods. Comprehensive elemental analysis and mapping demonstrated that Si, Ca, Al, O, and Fe constitute the predominant elemental components of the samples. FESEM analysis revealed well-defined crystalline morphologies and the development of microstructural porosity in selected specimens, while XRD patterns confirmed their crystalline nature. Phase assemblage analysis identified quartz (SiO_2), calcite ($CaCO_3$), alumina (Al_2O_3), and hematite (Fe_2O_3) as the dominant mineralogical constituents. Furthermore, the Particle and Heavy Ion Transport code system (PHITS) was used to determine and evaluate the protective nature, such as attenuation coefficients, radiation protection efficiency, transfer factors, and lead equivalent thickness. Moreover, shielding properties are compared with Phy-X/PSD database. Using Phy-X/PSD, the parameters such as linear, mass attenuation, half and tenth value layers, mean free path, effective conductivities, atomic number, and electron densities were estimated. Furthermore, the neutron shielding is also evaluated using both techniques. indicating significant radiation shielding potential. These findings support their suitability as low-cost, environmentally sustainable materials for radiation shielding applications.

URL: https://www.sciencedirect.com/science/article/abs/pii/S0969806X26002112?via%3Dihub

SCHOLARLY PUBLICATIONS
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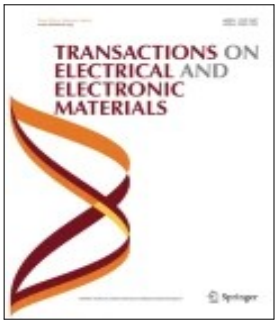
Journal Name: Transactions on Electrical and Electronic Materials **IF: 4.2**

Title: High Dielectric Constant Observation in Cerium Site Substitution on La0.67Ca0.33MnO3

Author: Subudhi D.K.; Biswal B.; Jena S.; Pattanaik P.; Das J.; Mishra D.K.

Details: Volume-27, Issue-4, August 2026

Abstract:$La_{0.67}Ca_{0.33}MnO_3$ (LCMO), $La_{0.67}Ca_{0.32}Ce_{0.01}MnO_3$ (LCMO@1Ce) and $La_{0.67}Ca_{0.23}Ce_{0.1}MnO_3$ (LCMO@10Ce) samples were synthesized successfully by solid state reaction technique at a sintering temperature of 1300 °C. A mixed phases of orthorhombic $LaMn_2O_5$ and $La_{0.67}Ca_{0.33}MnO_3$ with space group pbam and pnma, respectively have been observed in both LCMO and LCMO@10Ce. Only single phasic compound has been observed in LCMO@1Ce which suggest that 1% Ce substitute at Ca site plays role in forming stable single phasic LCMO. High dielectric constant value in the order of 10^{10} is observed in LCMO@10Ce at a frequency of 1 kHz and 40 °C. However, high dielectric loss and low impedance value is observed in LCMO@10Ce because of the presence of defects and impurity phases in the sample. Even LCMO@1Ce shows the dielectric constant value in the order of 10^7 at a frequency of 1 kHz and 40 °C, the low dielectric loss and single phasic nature proves this material appropriate for dielectric applications in the field of data storage. With increase in temperature, the magnitude of impedance gradually decreases which suggests the negative temperature coefficient of resistance (NTCR) behavior in undoped LCMO and Ce substituted samples.



URL: https://link.springer.com/article/10.1007/s42341-025-00663-3

SCHOLARLY PUBLICATIONS
School of Applied Sciences
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Journal Name: ChemCatChem **IF: 4.1**

Title: Stable UiO-66/BaTiO3 Heterostructure for Efficient Solar-Light Ciprofloxacin Degradation and Energy Harvesting Applications

Author: Dhal B.C.; Bhosale P.S.; Hajra S.; Panda S.P.; Das A.; Dutta B.; Kim H.J.; Sahu R.

Details: Volume 18, Issue 11, June 2026

Abstract: The fabrication of robust metal–organic frameworks (MOFs) continues to be difficult in materials science studies. In order to overcome such an obstacle, the design of hybrid framework materials could be an effective solution. Herein, we successfully synthesized UiO-66/$BaTiO_3$ hybrids with different percentages of $BaTiO_3$ mass (10%–50%), which are intended to improve the photocatalytic activity. Considering the widespread pollution of water resources with ciprofloxacin (CIP), leading to the emergence of antibiotic resistance, urgent treatment measures are needed. The optimized U/BTO-25 hybrid showed remarkable photocatalytic activity, with CIP removal reaching 98.37% in 30 min. Such excellent catalytic behavior is due to the complementary nature of both components, where the large specific surface area of UiO-66 helps with the adsorption of CIP, while ferroelectric polarization of $BaTiO_3$ leads to charge separation. In particular, the radical trapping experiments $\bullet O_2^-$ and h^+ to be the dominant radicals. The hybrid showed excellent stability in four successive cycles with a slight decline in efficiency. In addition, the hybrid has significant prospects for use in triboelectric nanogenerators. The output of the nanogenerator was 73 V and 180 nA, respectively, and the output can be harvested in a capacitor to power off-the-shelf electronic devices, demonstrating the potential of MOF-ferroelectric hybrid materials.

URL: https://chemistry-europe.onlinelibrary.wiley.com/doi/10.1002/cctc.70859

SCHOLARLY PUBLICATIONS
School of Applied Sciences
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Journal Name: Industrial & Engineering Chemistry Research **IF: 3.9**

Title: A Chlorophyll-Appended MIL-125-Ti Nanocomposite for Photodriven H2 Generation, Dye Degradation, and CWA Detoxification

Author: Dhal, BC; Swain, J; Acharya, D; Swain, S; Biswas, M; Ghosh, S; Dixit, A; Garg, P; Tyagi, AK; Sahu, R

Details: Volume 65, Issue 25, June 2026

Abstract: The growing environmental crises posed by synthetic dye pollution, chemical warfare agents (CWAs), and energy scarcity necessitate innovative, multifunctional solutions. In this regard, we present a hybrid MIL-125-Ti/Chlorophyll (MTC) nanocomposite that simultaneously addresses these challenges under visible-light irradiation. By integrating natural chlorophyll (0.2 wt %) into the MIL-125-Ti framework, we significantly enhance visible-light absorption and charge-separation efficiency through natural photosensitizers. The composite demonstrates exceptional triple functionality: (a) photocatalytic dye degradation, achieving 100% degradation of Rhodamine B (20 ppm) within 180 min (vs 76.2% for pristine MIL-125) via pseudo-first-order kinetics having rate constant: 0.02037 min-1; (b) hydrogen generation, with a 10-fold increase in photocurrent density (1.7 mu A cm-2) and a 1.5 times higher H2 production rate (265 mu mol h-1) compared to MIL-125; and (c) CWA detoxification, completely degrading Sarin (GB) within 15 min (vs 92.5% by MIL-125 in 30 min) following first-order kinetics. Therefore, the effective generation of the composite acted as a suitable and sustainable catalyst for light-driven environmental applications. Interestingly, the composite's stability remains intact even after four dye-degradation cycles. This work has exhibited a multifunctional platform for environmental remediation and clean energy production.

URL: https://pubs.acs.org/doi/10.1021/acs.iecr.5c04489

SCHOLARLY PUBLICATIONS
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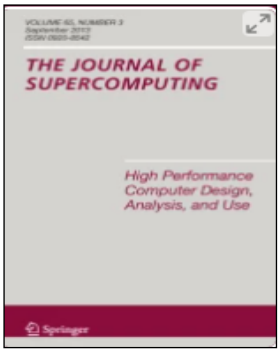
Journal Name: Journal of Supercomputing **IF: 3.5**

Title: Efficient hybrid approach for time-fractional (1 + 1)-dimensional Chafee–Infante equation using the Shehu–Adomian decomposition method in the Caputo environment

Author: Nayak S.K.; Jena S.R.

Details: Volume 82, Issue 8, June 2026

Abstract: In this study, we investigate the one-dimensional Chafee–Infante model, where heat diffusion serves as the primary mechanism of energy transfer. The Shehu transform is employed to derive solutions for three distinct forms of the Chafee–Infante equation, incorporating the time derivative in the Caputo fractional sense, and the resulting transformed systems are solved with the nonlinear terms using the Adomian decomposition method. The Chafee–Infante equation is widely used to model nonlinear phenomena in population dynamics, chemical reactions, heat transfer and neural activity. This study provides a new contribution by applying the Shehu decomposition method (SDM) to the time-fractional CI equation. The key advantage of the Shehu decomposition method (SDM) over transform-based hybrid methods such as Laplace–ADM, Sumudu–ADM and Elzaki–ADM lies in its direct handling of nonlinear problems without requiring inverse transforms, which significantly simplifies both analysis and computation. The present method also demonstrates accurate and convergent solutions, supported by error norms and rate of convergence analysis. For each case, the L2 and L∞ norms error norms are evaluated to assess accuracy. Numerical simulations, convergence investigations and comprehensive error and stability analyses consistently confirm excellent agreement between the analytical approximations and the exact solutions. The behavior of the solutions is further illustrated through three-dimensional surface plots and two-dimensional line graphs. Additionally, the numerical results obtained in this work are compared with existing findings in the literature, showing strong consistency and improved performance in terms of computational efficiency cost (CPU time).



URL: https://link.springer.com/article/10.1007/s11227-026-08572-9

SCHOLARLY PUBLICATIONS
School of Applied Sciences
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Journal Name: Food and Humanity **IF: 3.5**

Title: Biochemical insights of alpha-amylase activity in determining starch digestibility and glycaemic response in rice

Author: Nayak L.; Biswal M.; Das J.; Panda S.; Lal M.K.; Ngangkham U.; Kumar S.; Kumar A.

Details: Volume 7, December 2026

Abstract: Rice's impact on blood sugar is significant, particularly for those with diabetes. This study looks at the function of alpha (α)-amylase, a main starch-hydrolyzing enzyme, and its relationship to glycaemic index (GI), glycaemic load (GL), amylose content (AC), and resistant starch (RS) in the selected rice genotypes. Sixteen genotypes, comprising high-protein, scented, general, and pigmented rice, were tested for α-amylase activity during seed germination, and in mature grain eGI, GL, AC, and RS were also carried out. All four traits showed significant genotypic differences ($p < 0.05$) with the ranges of AC (4.42–25.5%); RS (0.4–1.86%); α-amylase (1.8–7.51U/100seeds) and eGI (54.46–72.15). Amylose content ($r = -0.53$) and RS ($r = –0.90$) were negatively correlated with GI; while α-amylase ($r = 0.94$) and GL ($r = 0.83$) were positively associated with eGI. Regression analysis confirmed a strong relationship of α-amylase with eGI ($R^2=0.88$), while a moderate relationship to GL ($R^2=0.62$). Principal Component Analysis and hierarchical clustering grouped genotypes into distinct clusters, with pigmented rice often exhibiting a desirable combination of high AC, high RS, and low eGI. This study proposes seed α-amylase activity as an exploratory correlation study proposing a potential screening marker for identifying rice genotypes with altered starch digestibility and suggesting its use helps screening in rice breeding programs for developing health-oriented rice cultivars.

URL: https://www.sciencedirect.com/science/article/abs/pii/S2949824426002673?via%3Dihub

SCHOLARLY PUBLICATIONS
School of Applied Sciences
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Journal Name: Dalton Transactions **IF: 3.3**

Title: Synthesis and characterization of honeycomb-like carboxylate-bridged dimeric Cu(ii) and Zn(ii)-based coordination polymers with a pyridyl Schiff base linker: dye sorption and Schottky device applications

Author: Saha K.; Jana S.R.; Das P.; Dutta B.; Banerjee M.; Naskar S.; Jana N.C.; Hossain S.S.; Bera B.; Sinha C.

Details: Volume -55, Issue-26, 7th July 2026

Abstract: The coordination polymers (CPs)/metal–organic frameworks (MOFs) incorporating hetero-bridging ligands have remarkable efficiency and versatility towards fulfilling the objectives of the Sustainable Development Goals (SDGs). In this aspect, two CPs, $[Cu_2(3\text{-bph})_2(adc)_4]_n$ (CP1) and $[Zn_2(3\text{-bph})_2(adc)_4]_n$ (CP2) (3-bph = (1E,2E)-1,2-bis(pyridin-3-ylmethylene)hydrazine and adc^- = 1-adamantanecarboxylate), are characterised, and their significant semiconducting property and selective dye sorption activity are explored. The CPs comprise a secondary building unit (SBU) of a carboxylate-bridging adc^- paddle-wheel, $[M_2(adc)_4]$ (M = Cu(ii), Zn(ii)), which undergoes pyridyl-N linking by 3-bph to form a 1D chain, where the pyridyl rings undergo π–π interaction to construct a 2D honeycomb-supramolecular network. Interestingly, CP1 demonstrates the selective sorption of methyl red (MR) dye out of four dyes (methylene blue, rhodamine B, methyl red, and methyl orange) with a removal efficiency of 95.37% from aqueous solution within 1 h, whereas CP2 does not show measurable sorption activity. The sorption of CP1 fits the Langmuir isotherm (R^2 = 0.9875) and follows pseudo-second-order kinetics, indicating chemisorption on a heterogeneous surface. The DFT calculations using crystallographic parameters determined the band gaps in the semiconducting region (2.39 eV (cal.) and 3.68 eV (exp.) for CP1 and 2.32 eV (cal.) and 3.65 eV (exp.) for CP2). This inspired the measurement of the electrical conductivity from a fabricated Schottky device with thin film electrodes, ITO/CPs/Al. The experiments show that CP2 (5.27×10^{-3} S m^{-1}) has higher electrical conductivity than CP1 (2.72×10^{-3} S m^{-1}) under identical conditions, which explains the superior charge-transport features of CP2 in comparison with CP1.

URL: https://pubs.rsc.org/dt/article-abstract/55/26/10000/1265828/Synthesis-and-characterization-of-honeycomb-like?redirectedFrom=fulltext

SCHOLARLY PUBLICATIONS
School of Applied Sciences
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Journal Name: **Meteoritics and Planetary Science** **IF: 3.2**

Title: Evaluating maturity of organic matter in hydrated C1 and CM-like clasts and a dehydrated clast within a polymict eucrite and a howardite

Author: Das S.P.; Maturilli A.; Van den Neucker A.; Patzek M.; Panda D.K.; Pradhan G.K.; Thangjam G.; Rout S.S.

Details: 22nd June, 2026

Abstract: Volatile-rich xenolithic clasts in different types of brecciated meteorites represent unique pristine solar system material. This study investigates the maturity and thermal history of organic matter using Raman spectroscopy and aqueous alteration effects using infrared spectroscopy in the matrix of 15 volatile-rich clasts (C1 and CM-like) present in a polymict eucrite (NWA 7542) and a howardite (Sarıçiçek). Most of the studied C1 and CM-like clasts show similar maturity of organic matter as CI chondrites and CM chondrites, respectively. One CM-like clast from the polymict eucrite NWA 7542 shows Raman spectral signatures of heating after aqueous alteration, and another C1 and a CM-like clast from the howardite Sarıçiçek exhibit unique Raman spectral properties probably related to differences in accreted precursor organics compared to CI and CM-chondrites. One olivine-rich, unclassified clast has a high concentration of fayalitic olivine in its matrix, similar to oxidized CV chondrites and other features similar to CM- or C2 chondrites. Various evidence shows that this clast was heated up to 700–800 °C post aqueous alteration followed by the formation of fayalitic olivine during a metasomatic alteration process. Peak metamorphic temperature (PMT) estimated using different thermometric approaches does not provide reliable data for clasts altered at low temperatures (<200 °C).

URL: https://onlinelibrary.wiley.com/doi/10.1111/maps.70183

SCHOLARLY PUBLICATIONS
School of Applied Sciences
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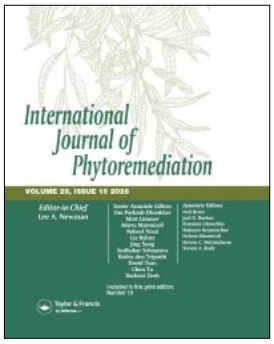
Journal Name: International Journal of Phytoremediation **IF: 3.1**

Title: Stoichiometric insights into heavy metal phytoremediation by two aquatic macrophytes: Comparative evaluation of Pontederia crassipes and Actinoscirpus grossus

Author: Sarangi B.S.; Maity J.P.; Pradhan A.A.; Rout A.P.

Details: 16th July, 2026

Abstract: Aquatic macrophytes are increasingly explored for their potential in remediating wetlands contaminated with heavy metals (potentially toxic elements: PTEs), yet the biochemical determinants of their adsorption efficiency remain poorly understood. Present study investigates the phytoremediation potential of Actinoscirpus grossus and Pontederia crassipes by linking organ-specific distributions of total organic carbon (TOC) and total nitrogen (TN) with PTEs uptake. The sediment and plant samples were collected from polluted aquatic environments, followed by elemental analysis using WD-XRF and inductively coupled plasma mass spectrometry (ICP-MS). Plant organs (roots, stems, leaves, and flowers) were analyzed for TOC and TN using high-temperature combustion methods. Statistical analysis, including paired t-test, Wilcoxon's signed-rank test, and Pearson's correlation, were used to compare species differences and method agreement. Roots acted as the primary accumulation sites, accounting for approximately 20–30% higher concentrations of Zn, Cu, Pb, and Cd compared to aerial tissues. The Pontederia crassipes favored phytostabilization, particularly for Pb and Cu, whereas Actinoscirpus grossus showed enhanced uptake of Cr, Ni, and Co, indicating stronger phytoextraction potential. Actinoscirpus grossus also exhibited consistently higher TOC and TN across plant organs, suggesting greater metabolic flexibility and biosorption capacity. The C/N ratio demonstrated clear organ-level differentiation, with highest values in flowers (≈21–28) and lowest in roots (≈7–10), reflecting structural versus metabolic allocation strategies. Bland–Altman's analysis confirmed good agreement between TOC and TN estimation approaches. Overall findings suggest that stoichiometric balance (TOC-TN) is closely associated with PTE uptake behavior, and that combining species with complementary functional traits can enhance the efficiency of phytoremediation systems in contaminated aquatic environments.



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