

Annual Report

2023-2024



Institute of Mining, Mineralogy and Metallurgy (IMMM)
Bangladesh Council of Scientific and Industrial Research (BCSIR)
Science Laboratory Road, Khanjanpur, Joypurhat-5900



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IMMM, BCSIR, Joypurhat-5900

June, 2025



Message from the Chairman
Bangladesh Council of Scientific and Industrial Research

It is a great contentment for me to know that the Institute of Mining Mineralogy and Metallurgy (IMMM) which is unique of its type in the country, has successfully completed its journey for the fiscal year 2023-2024 and consequently presenting its 'Annual Report'.

IMMM, since its establishment is running smoothly and the get-up-and-go of IMMM to accomplish praiseworthy tasks is undoubtedly extensive. Indeed, the contribution of IMMM in the field of research and development (R&D) is always creditable. It must be mentioned here that to strengthen the R&D sector, IMMM has explored research activities with a number of international research institutions, such as CSIRO Melbourne (Australia), CSIR-Institute of Minerals and Materials Technology (CSIR-IMMT) Bhubaneswar, Odisha (India), and Korean Institute of Geosciences and Mineral Resources (KIGAM) (Korea). Besides conducting regular R&D activities, this single-tracked research entity is also mandated to provide analytical services, training programs and supervise research students of different universities for their higher degrees.

This Annual Report 2023-2024 is a comprehensive document which covers each and every single attempts accomplished by the scientists of IMMM during the said time-frame. I am confident that this report will satisfy you providing sufficient information which are of relevance to the mining, mineralogy and metallurgy sectors.

I thank the Director, Scientists, Engineers and all other staffs of IMMM who are associated with the journey of this unit.

In conclusion of this message special thanks to the publication team for their contribution in bringing out this comprehensive Annual Report.

Dr. Samina Ahmed
Chairman, BCSIR



Message from the Director, IMMM

I am delighted to announce that the Institute of Mining, Mineralogy, and Metallurgy (IMMM) at BCSIR, Joypurhat, is set to publish its annual report for 2023-2024. This institute stands out in mining, mineralogy, and metallurgy. The report showcases various activities from this period, including research and development (R&D), processes and patents, publications, student guidance, and other significant contributions by our scientists and engineers.

I am privileged to note that the annual report for IMMM's activities during 2023-2024 is ready for publication. IMMM's mission is to conduct, promote, and guide scientific, industrial, and technological research using various raw materials, gangue, and ore minerals. This work is aimed at developing processes, patents, and scientific publications that maximize economic, environmental, and social benefits for the people of Bangladesh. Various scientific conferences and training programs enhance the knowledge and expertise of our scientists.

I believe that a comprehensive presentation of all research activities across multidisciplinary areas will be highly beneficial for industrialists and entrepreneurs.

I extend my appreciation to the editorial committee members who made this report possible. My heartfelt thanks go to the scientists, engineers, and all other staff members who have diligently contributed to our nation's progress through their work.

Lastly, I express my gratitude to the Chairman of BCSIR for her encouragement in the preparation of this report.

A handwritten signature in black ink, appearing to read 'John Liton Munshi'.

John Liton Munshi
Director (Addl.Charge)
IMMM, BCSIR, Joypurhat

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INTRODUCTION

The Institute of Mining Mineralogy and Metallurgy (IMMM) is one of the leading wings of the Bangladesh Council of Scientific and Industrial Research (BCSIR). It was established to grow up not only for the sustainable economy of Bangladesh but also for taking part in the journey of making Bangladesh a Developed Country. Though it is a multidisciplinary operating unit, its major research activities are related to containing Mining, Mineralogy, and Metallurgy fields. Previously, it was a development project of BCSIR starting in 2001 funded by the Ministry of Science and Technology and established in Joypurhat after having acquired about seven acres of land with other infrastructures from the Joypurhat limestone and cement factory project of Petrobangla. After the completion of the project in March 2009, the institute turned to a revenue budget with freshly appointed employees in June 2010. A total of seventy seven employees are working, out of which twenty six are scientists and engineers.

A mineral processing plant was established in June 2021 within the premises of IMMM under the ADP project titled “**Establishment of Mineral Processing Center at IMMM**”. The plant has been inaugurated on May 2023. The plant is equipped with sophisticated instruments from the separation of raw sand to the final refined products. This plant newly adopts a spiral gravity separator system for the first time in Bangladesh to separate the light and heavy minerals from the river sands, especially Brahmaputra –a renewable source of sand. It also ushers a promising scope for the researcher and relevant industrial entity to exercise the pilot plant study before process lease-out and commercialization, respectively.

IMMM is the only research organization in Bangladesh that conducts research in the field of mining, mineralogy, and metallurgy in Bangladesh. The following research, development, and innovation competencies exist within the unit (1) Mining Division (2) Mineralogy Division and (3) Metallurgy Division.

The functions of the institute are as follows:

- To conduct research on mining, mineralogy, and metallurgical fields to enhance the BCSIR activities.
- To exploit the mineral deposits and carry out research on the innovation of commercial and exportable industrial products from the exploited mineral/ore deposits of the country.
- To carry out advanced research and develop mineral processing systems from the promising minerals/ores.
- To develop metallurgical processes and advanced technology for establishing various industries in the country i.e. agricultural tools, automobile parts, shipbuilding spare parts, composite manufacturing industry, etc.
- To enhance the laboratories and research facilities within the field of mining, mineralogy, and metallurgy.
- To provide training facilities for the development of manpower and upgrading the working knowledge of the workers of mining, mineralogy, and metallurgical industries.
- To provide research facilities/higher studies to the Universities, government, and non-government organizations.
- To provide technical assistance to the material processing metal industries.
- To render analytical and testing services to the materials and metal product industries for their raw materials and finished products.

Mission: Conducting mining, mineral processing, and metallurgical research activities, process and technology development, promote industrialization and employment generation and thus achieving socio-economic development of the country and nation.

Vision: Utilization of Minerals and materials resources of the country in industrialization by indigenous technology.

RESEARCH AND DEVELOPMENT (R&D) ACTIVITIES MINING DIVISION

Mining is the extraction of valuable geological materials from the earth, usually from an ore body, vein, or coal seam. The mining division of IMMM is engaged in research work on mine planning and designing to develop minefields and solve mine-based industrial problems including support design, water management, subsidence, etc. This division has initiated advanced research and developed newer scientific solutions to the problems in the mining sector. Identification and characterization of mine products in order to make the best use of them in industrial sectors. This division is also engaged to help public and private organizations with different issues in the mining sector.

Geochemical study of arsenic and other toxic elements in groundwater and sediments of Bangladesh

Md. Imam Sohel Hossain (SO), Mst Sanjida Sultana (SSO), Shamim Ahmed (PSO), Dr. Pradip Kumar Biswas (PSO), Dr. Mohammad Nazim Zaman (CSO), Professor Dr. Subrata Kumar Saha, Professor Dr. Md. Mostafizur Rahman

Duration: July 2022-June 2024

Background of the Project:

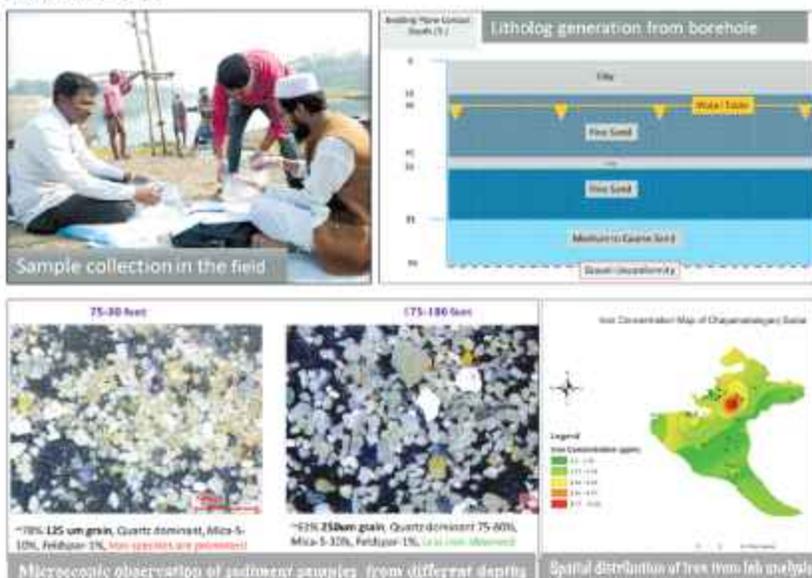
In the recent past, high concentrations of Arsenic (As) have been reported in the groundwater samples of various areas of Bangladesh. The problem is intensifying day by day, and more and more areas have been contaminated with groundwater Arsenic. Many studies confirmed that more than 3 million out of 11 million wells in Bangladesh contain $>10 \mu\text{g/L}$ Arsenic level, and approximately 20 million habitants in Bangladesh are exposed to water with As level $>50 \mu\text{g/L}$. In Bangladesh, about 86% of the total groundwater withdrawn is used for irrigation while 97% of the population depends on groundwater for drinking purpose. The Department of Public Health Engineering (DPHE) found that 1.2 million wells out of three to four million are contaminated with As. Nahar (2007) has reported that every year 4% of tube wells is getting contaminated by As in her study area, Bangladesh. Literature found that As mobilization in Bangladesh groundwater is a complex natural geochemical process. Apart from the physicochemical properties, trace metal (loid) s such as As, Fe, Mn, Zn, Pb, and Cd were found in excess content in groundwater. As overexposure to Fe and Mn can cause adverse health risks.

Arsenic contamination has primarily affected the shallow aquifer (usually less than 100 meters), and there is a distinct regional pattern, with the greatest contamination in the south and southeast and least in the northwest. Awareness about the presence of arsenic in Bangladesh has been growing since late 1993, when arsenic was first tested and detected in groundwater samples from the district of Chapai Nawabgonj. Since then, higher levels of arsenic (exceeding the WHO standard of 10 ppb and Bangladesh standard of 50 ppb) have been detected in many regions of the country. Different results revealed some “hot spots” of high arsenic concentration in some of the least-contaminated regions (e.g., Chapai Nawabgonj in western Bangladesh), and it was recognized

that the sample density in the BGS/DPHE survey was not sufficient to ensure detection of all such hot spots.

According to previous studies, the Southwestern region is more vulnerable to safe drinking water because both surface and ground water are filthy with acute and high salinity intrusion from the Bay of Bengal along with arsenic contaminated ground water and drought. Since agriculture is the mainstay of the people in the Southwestern region, agricultural intensification causes the rapid increase in water use for irrigation purposes. As a consequence, increasing demand for water and challenges of water distribution and management become more crucial. Water related problems pose a grave threat to rural living, livelihood and food security. For example, most of the people in this area use arsenic-contaminated groundwater for drinking by installing shallow hand tube-well without taking into account health impacts.

The condition of groundwater is changing due to its abstraction, recharge, and interactions with underground parent materials. Therefore, an updated study regarding groundwater quality as well as regular monitoring is essential. There are several published reports and studies on the hydro-geochemical investigation of groundwater. Hence, there are scopes to utilize different water quality indices to classify the groundwater quality and the data could be analysis with advanced statistical analysis (using different software and modelling) for future aspects. In these circumstances, this study aims to study the geochemical analysis of the shallow aquifers and surrounding sediments with new data from western Bangladesh as well as to evaluate the impact of groundwater on human health.



Objectives of the R&D Project:

The main objectives of this research are as follows:

- i. Geochemical study of trace elements of ground water and sediments.
- ii. Identifying water quality and health risk assessment of these region for concern of public health.
- iii. Data analysis and interpretation with advanced statistical analysis (using different software and modelling) and machine learning algorithm regarding groundwater quality.

Progress achieved:

The project has been completed.

Treatment of Paper Mill Effluent for Reuse as Irrigation Water

Sharmin Sultana (SSO), Md. Imam Sohel Hossain (SO), Md. Aminur Rahman (PSO), Md. Ahedul Akbar (PSO), Mohammad Nazim Zaman (CSO) and Mohammad Enayet Hossain

Duration: July 2023-June 2025.

Background of the Project

Pulp and paper mill industries are one of the major effluent generating industries in Bangladesh. Generally, Effluent discharged from pulp and paper mill has a mixture of chemicals used for the digestion of raw wood chips, cellulose fibers, lignin and also wood preservatives. However, this effluent is utilized for irrigation purposes in developing countries like India, Bangladesh without any proper treatment. The composite nature of pulp and paper mill effluents made it difficult to apply them directly on fields. The high-water usage ranges between 20,000 and 60,000 gallons per ton of product results in large amount of effluent generation.



Figure: Photographs taken during sample collection and laboratory analysis.

Ground water and surface water are the main source of irrigation in Bangladesh. But this source is depleting beyond pumping level day by day. Wastewater or effluent is the water that has been adversely affected in quality by anthropogenic influence. This used water can be reused by proper management. Most of the industries don't want to run their ETP regularly due to high cost of treatment process. Peru Ecuador, China, Morocco etc. are using treated effluent as irrigation water in their crop production. If we can manage the waste water treatment properly then water pollution will be controlled.

Objectives of the R&D Project

The main objectives of this research are as follows:

- To develop a cost effective treatment process for paper mill effluent.
- To compare water quality of treated effluent with the standard of irrigation water (Environment Conservation Rules 1997) of Bangladesh.
- To investigate the irrigation suitability of treated effluent in agricultural purposes.

Progress achieved

Sample collection is completed and laboratory analysis is going on.

MINERALOGY DIVISION

Mineralogy is an earth science focused on the chemistry, crystal structure, and physical properties of minerals. The division has initiated advanced research in the field of mineralogy and developed new science and technologies to help local and export-oriented industries. The scientists (geologists, mineralogists, and chemists) of this division are engaged in the exploration of indigenous mineral resources, characterization, reserve estimation, and mineralogical and geological studies of the explored minerals and their industrial uses in order to substitute the imported raw materials used in the local industries.

Assessment of Critical Mineral Resources in the Brahmaputra River, Bangladesh

Dr. Md. Aminur Rahman (PSO), Md. Imam Sohel Hossain (SSO), Md. Shohel Rana (SSO), Abu Yusuf (SO), Sharmin Sultana (SSO), Abdul Kader Fakir (SO), Dr. Mark Pownceby (Senior Principal Research Scientist)

Duration: July 2023-June 2025

Background of the Project:

Critical minerals are pivotal to modern human society. Many critical minerals are irreplaceable components of technological and industrial advancement, especially for renewable energy systems, electric vehicles, rechargeable batteries, consumer electronics, telecommunications, specialty alloys, and defense technologies. The new and emerging technologies rapidly changing our day-to-day lives are driving a global demand for critical minerals. A world of smart phones and laptop computers, solar panels and wind turbines, advanced manufacturing, and health applications have ranked minerals such as antimony, cobalt, lithium and rare earth elements as “critical”. To be classified as critical the mineral must be both economically important to society and vulnerable to supply disruption.

The minerals sector of Bangladesh produces mainly cement, coal, iron and steel, natural gas, petroleum refinery products, salt, and stone, but only small amounts of industrial minerals, such as crushed granite, and processed products. More recently studies have indicated the presence of valuable heavy minerals in fluvial deposits from the major river systems such as the Brahmaputra River, Tista River etc. Although some critical minerals are mined as primary products, many critical minerals are extracted as companion products from major mineral production. Considering Bangladesh’s expertise in mining and processing as well as extensive mineral resources likely to contain critical minerals, there is potential for Bangladesh to develop into a supplier of critical minerals

SAMPLE ID	Dy ₂ O ₃ (PPM)	Ho ₂ O ₃ (PPM)	Er ₂ O ₃ (PPM)	Tm ₂ O ₃ (PPM)	Yb ₂ O ₃ (PPM)	Lu ₂ O ₃ (PPM)	La ₂ O ₃ (%)	CeO ₂ (%)	REO Sum (%)
Mag 1	1170	260	860	170	810	100	0.6	1.22	2.9
Mag 2	1680	220	670	70	520	<50	2.81	5.88	12.7
Mag 3 [A]	1710	180	540	<50	400	<50	3.57	7.51	16.0
Mag 3 [B]	1630	150	520	<50	380	<50	3.46	7.26	15.5
Mag mix	1910	220	720	70	570	<50	3.37	7.06	15.2

Rare Earth Element (REE) suite in magnetic fractions of Brahmaputra River sand

Sample	Mag mix	Mag 1	Mag 2	Mag 3
Garnet	6.2	39.9	5.6	3.6
Epidote	20.4	11.4	28.2	10.4
Epidote-Allanite	4.6	9.4	7.6	2.3
Zircon	18.2	2.5	9	28
Monazite-(Ce)	23.6	4.9	19.1	19.1
Titanium dioxide	6.4	1.6	3.6	12.2
Amphibole	4	8.6	5.4	1.8
Staurolite	2.2	3.3	6.6	2.5
Titanite	3.6	1.4	2.5	6.2
Fluorapatite	1.3	0.27	0.81	3.7
Spinel	0.52	3.1	0.63	0.27
Xenotime-(Y)	0.63	2.8	1	0.2
Pyroxene	1.8	2.7	2.3	2
Dravite-Schorl	1.4	0.66	2.4	1.4
Ilmenite	0.96	2.2	0.68	0.17

Results of the QPA (relative wt. % of crystalline phases) in magnetic fractions of Brahmaputra River sand

Objectives of the R&D Project:

The main aim of this project is to investigate critical minerals from river sands and other potential sources – these investigations will focus on

- Obtaining new knowledge on the composition and characteristics of critical minerals and Investigating methods for separating the critical minerals from river sands and other potential sources.
- Summarizes the key issues affecting the future of critical minerals in Bangladesh, and outlines a range of areas that warrant further investigation.
- To determine recovery rates during metallurgical processes (publicly available critical mineral behavior in ore data and studies are extremely rare).
- Undertake consumer and supplier mineral criticality assessments for Bangladesh to maximize future potential in the critical minerals global economy.

Progress achieved:

Field visit and sample collection from Brahmaputra-Jamuna River were completed. Samples are currently separating and analyzing in the lab at the IMM laboratory.

Development of Sustainable and environment-friendly Pavement blocks with Rice husk ash

Mst. Shanjida Sultana, SSO; Dr. Mohammad Nazim Zaman CSO; Dr Pradip Kumar Biswas, PSO; Md. Imam Sohel Hossain, SO.

Duration: July 2022-June 2024

Background:

Rice husk ash (RHA) is obtained from the burning of rice husk, is a by-product of the rice-milling industry. By weight, 10 % of the rice grain is rice husk and on burning the rice husk about 20 % becomes RHA. Bangladesh is the world's third-largest rice producer. (36 million metric tons in

2020) and generated more than 2.5 metric tons of RHA in 2020. Most mills are located by main roads and highways. As a result, hot and toxic RHA is often dumped by highways and in other public places like farm lands and open spaces near residential areas.

Silica is predominant (85-95%) in RHA. Materials those are rich in siliceous or siliceous and aluminous contents are known as pozzolans. Pozzolan materials can be acted as compounds possessing cementitious properties. RHA has a strong potential to replace cement by up to 10% to 20% without compromising concrete performance in terms of workability, strength, and durability. Therefore, RHA is becoming one of the best replacement materials to reduce the dependency on cement in many countries and Bangladesh, as well as solving environmental pollution problems.

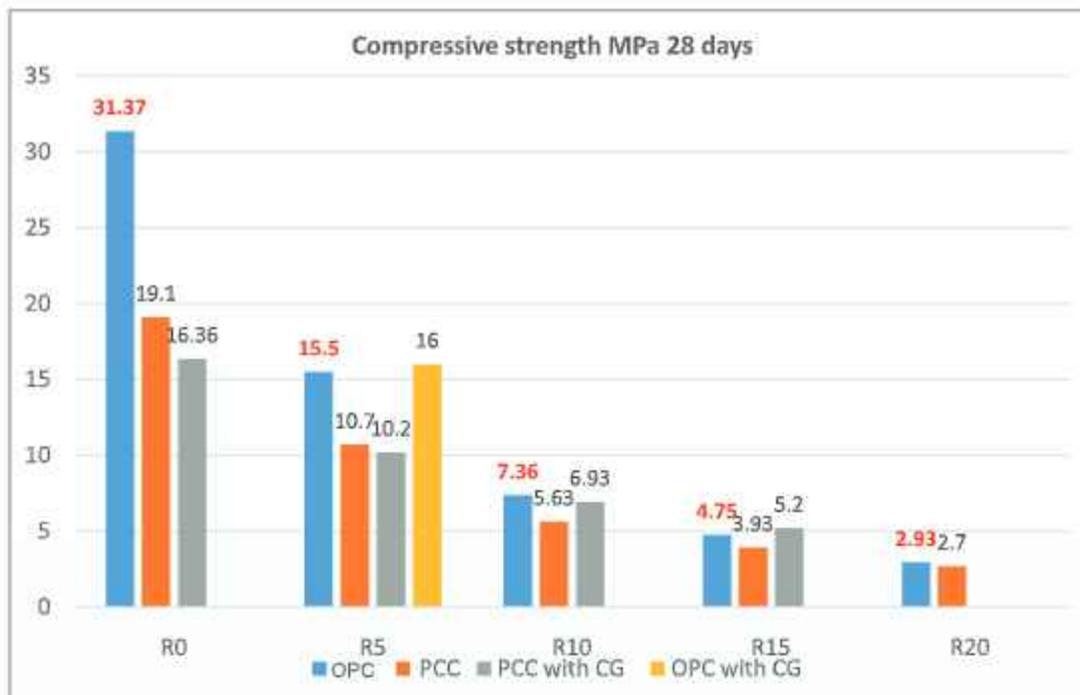


Figure: Developed pavement block from rice husk ash

Objectives of the Proposed R&D Project:

In this research developed and characterized pavement blocks, using rice husk ash (RHA) with partial replacement of cement and sand. To develop sustainable and environment friendly pavement blocks / bricks using rice husk ash (RHA).

The compressive strength decreases with the increases in percentage of rice husk ash (RHA). Pavement blocks using 5% RHA replacement gave better results.



Output of the project:

The project is completed. A process on the basis of the project has been accepted by BCSIR authorities.

Risk assessment of potentially toxic metals in street dust of the Chattogram city, Bangladesh

Md. Sha Alam (SSO), Md. Imam Sohel Hossain (SO), Dr. Pradip Kumar Biswas (PSO), Md. Mahfujul Hasan (SSO), Dr. Professor Abu Reza Md. Towfiqul Islam, Professor Dr. Md. Mostafizur Rahman

Duration: July 2022-June 2024

Background:

With the rapid growth of urban populations and the acceleration of urbanization, urban environmental pollution has become more and more serious in recent years, particularly with regard to air pollution (Shi and Lu, 2018). Street dust in both urban and industrial areas often contains high levels of hazardous substances such as potentially toxic metals (PTMs) (Wang et al., 2021; Xiong et al., 2017), is mostly generated by human activities, including coal combustion, traffic exhaust, building smokes and industrial emissions (Zheng et al., 2020). Characterizing the dominant anthropogenic sources of metals in street dust is important to aid the implementation of suitable management strategies, as well as to quantify the levels of pollution.



Fig: Different Sampling locations in the Chattogram city area.

Particulate pollution has sharply increased over time. Since 1998, the average annual particulate pollution has increased by 39 percent, reducing the average life expectancy of a Bangladeshi citizen by 2.1 years. (<https://aqi.epic.uchicago.edu/country-spotlight/bangladesh/>). However several studies confirmed the presence of elevated concentrations of potentially toxic metals in soils, water, and sediments in the industrial areas of the country. It has been reported that the concentration of heavy metals in irrigation water and soil of the industrial areas of Dhaka was much higher than the recommended level (Ahmed and Goni., 2010). Only a few studies have evaluated the accumulation of heavy metals in the soils of the Chattogram city area. Alam et al., 2011 and Alamgir et al., 2015 conducted research on urban soils, and municipal and industrial waste of the Chittagong city area

and reported elevated concentrations of heavy metals.

Urbanization and industrialization in Bangladesh have taken place at an unprecedented in the last decades and moving forward at an irresistible pace including Chattogram, the second largest city in the country. Due to excessive urban development and heavy traffic systems, street dust in Chittagong City is expected to be contaminated with toxic metals like other megacities in the world. Therefore the objectives of the study will be performed the determination pollution level of potentially toxic metals (Ba, Ca, Cd, Cu Zn, Fe, Mn, Cr, Pb, Ni, As, and Hg) with spatial variations, ecological-health risk assessment and determine potential sources of the metals.



Fig: Photos taken during street dust sample collection at different locations in Chattogram City

Objectives of the R&D Project:

The main objectives of this research are as follows:

- * Determination of potentially toxic metals (PTM's) and their spatial distribution
- * Human health and ecological risk assessment.
- * Source identification of potentially toxic metals (PTM's)

Progress achieved:

A total of 150 no's street dust samples were collected from different locations in the Chattogram city area and sieve analysis has been done as part of the sampling process. These samples have been analyzed for Potentially Toxic Metals (PTMs) using an Atomic Absorption Spectrometer (AAS) at the IMMM laboratory. Currently, a manuscript is being prepared for publication

Development of composite materials from waste plastics and sand

Md. Nuruzzaman, SO (PL), Md. Sha Alam, SSO (RA), Md. Shohel Rana, SO (RA), Abu Yousuf, SO (RA), Hayatullah, SO (RA), Dr. Md. Aminur Rahman, PSO (RA), Dr. Pradip Kumar Biswas, PSO (RA.)

Duration: July 2023-June 2025.

Background of the proposed R&D project:

Waste plastics are a significant issue in underdeveloped nations, where efficient collection and recycling systems are frequently insufficient. Among solid wastes, plastic waste is a critical issue both nationally and globally. It has the potential to impact ecosystem capacity to adapt to climate change and can disrupt habitats, natural processes, and the social and economic well-being of millions of people, according to the United Nations Environment Programme (UNEP).



Figure: Some pictures of the raw materials, composite preparation, prepared composite and mechanical properties analysis.

The urban regions of Bangladesh presently produce 633,129 tons of plastic waste annually. Approximately 51% of this plastic waste is recycled, while the remaining waste is not. Recycling

leftover waste has the potential to save USD 801 million per year. Therefore, finding an eco-friendly solution for recycling has become crucial. This research aimed to investigate the production of plastic-bonded sand composites utilizing recycled plastic waste as a binding agent that can be employed in construction. The research focuses on creating composites using high-density polyethylene (HDPE), low-density polyethylene (LDPE), polypropylene (PP), and polyethylene terephthalate (PET) because they are the most common types of plastic waste. This recycling technique has the potential to address the global plastic waste problem as it transforms discarded plastic materials into valuable local resources. As part of the research, waste materials made of HDPE, LDPE, PP, and PET will be melted and combined with sand to produce samples of composite materials for different applications.

Objectives of the proposed R&D project:

- To utilize and reuse locally available plastic waste in Bangladesh.
- To develop composite materials from plastic waste and sand.
- To find out the mechanical properties of waste plastic-sand composite for different applications.

Progress achieved (60%)

Sample collection, and characterization completed, composite preparation started and properties of the composite will be determined.

METALLURGY DIVISION

Metallurgy, a field within materials science, examines the physical and chemical properties of metallic elements, their inter-metallic compounds, and their alloys. Metallurgy division of IMMM is dedicated to developing efficient methods for processing and producing materials to optimally utilize the various minerals, metals, and ores found in Bangladesh. Our researchers conduct extensive investigations in areas such as materials processing, extractive metallurgy, foundry technology, composite materials, and advanced ceramic engineering. These efforts aim to meet the evolving technological demands for advanced materials and introduce innovative approaches to the industrial sector. Our primary objective is to address the metallurgical challenges faced by local industries. The R&D activities of metallurgy division has been contributing to fundamental knowledge by publishing articles in peer reviewed journals and presenting their research in various international conferences. So far, scientists of this division led projects which delivered several processes/technologies including the development of Pb-free solder alloys, arc welding electrode using indigenous resources and recovery of aluminum from discarded beverage cans. Among them Pb-free solder alloy process has been leased out by BCSIR for commercial production. Currently, our research is focused on the sustainable recovery of metals from various sources including electronic waste (e-waste), steel industry flue dust to recover valuable metals to be used in further manufacturing. We strive to extract these valuable metals from discarded materials using environmentally friendly methods, reflecting our commitment to advancing materials science while promoting ecological sustainability.

Development of a Flexible Storage System from BaTiO₃ Composite with Polymer

Syed Shafquat Mahmood (SSO), Mohammad Sajjad Hossain (SSO), Md. Hasnain Mustak (SO), Md. Mustafijur Rahman (SSO), Prof. Dr. Mohammad Belal Hossen

Duration: July 2023-June 2025

Energy, resource, and environment have become three significant issues in the world. Development of environment friendly, renewable, biodegradable, and high-performance energy storage materials is in great demand for construction of a low-carbon society. Recently, film dielectric capacitors with high energy density have attracted much attention, owing to the increasing demand for lightweight, flexible, highly integrated, portable, wearable, implantable, and economical electronic devices. They are electrical capacitors with an insulating plastic film as the dielectric, sometimes combined with paper as carrier of the electrodes. Nowadays, the most used dielectric film materials are polypropylene (PP) with a market share of 50%, followed by polyester (PET), with a 40% share. The remaining 10% share is accounted for by the other dielectric materials, including polyphenylene sulfide (PPS) and paper with roughly 3% each, and the rest is occupied by polyethylene naphthalate (PEN), polytetrafluoroethylene (PTFE), polystyrene (PS), polycarbonate (PC), poly (vinylidene fluoride) (PVDF), epoxy resin (EPR), poly (methyl methacrylate) (PMMA), polyimide (PI) etc. Paper is made from cellulose, the most abundant natural polymer on earth with good biodegradation, renewability, and biocompatibility; however, it possesses too many pores, leading to low mechanical property, breakdown strength, and energy density and high dielectric loss. In consideration with these issues, incorporating poly (vinylidene fluoride) (PVDF) with the natural cellulose can be a better solution for further improvement. Thus, developing novel cellulose, or partial modified cellulose with synthetic polymer-based dielectric films for new “green” and high-performance film dielectric capacity is in great demand.



Figure: Photographs showing various stages of the composite film synthesis process.

Objectives of the R&D Project:

- Fabrication of natural (cellulose)/synthetic polymer based BaTiO₃ nanocomposite films.
- Minimizing fabrication cost by selecting conducive method.
- Optimization of dielectric constant, dielectric loss, discharge energy density, tensile strength, etc. of the prepared films.

Progress achieved:

Microcrystalline cellulose from soft wood pulp has been synthesized and composite film has been formed with BaTiO₃. Crystallographic, morphological and capacitance characterization has been done. Currently, synthetic composite film is being synthesized.

ACHIEVEMENTS AND OTHER ACTIVITIES

PUBLISHED JOURNAL ARTICLES

1. Saha, A., Roy, D.K., Khan, R., Ornee, T.I., Goswami, S., Idris, A.M., Biswas, P.K. and Tamim, U., 2023. Provenance, weathering, climate and tectonic setting of Padma River sediments, Bangladesh: A geochemical approach. *CATENA*, 233, p.107485.
2. Rana, M. S., Saha, M. S., Biswas, P. K., Shahriar, M. S., Ahmed, F., & Zaman, M. N. (2023). Characterization and upgrading of low-grade Brahmaputra River Basin Ilmenite Concentrate: Exploring an alternate feedstock for synthetic rutile preparation. *JOM*, 75(12), 5773–5784. <https://doi.org/10.1007/s11837-023-06155-0>
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15. Hossain, M.S., Rahman, A., Shahriar, M.S., Bari, Z. and Yasir, M., 2023. REEs enriched heavy minerals from the river and beach sands of Bangladesh. *Arabian Journal of Geosciences*, 16(1), p.91.
16. Rahman, M., Chaity, I. J., Hossain, M. I. S., & Siddique, M. A. M. (2024). Surface water pollution by some heavy metals in a remote island, Hatiya, northern Bay of Bengal. *Journal of Trace Elements and Minerals*, 8, 100150. <https://doi.org/10.1016/j.jtemin.2024.100150>

ACCEPTED JOURNAL ARTICLES

1. Mustak, M.H., Islam, K.S., Alam, M.S. et al. Revalorization of Coconut Husk Lignin through ZnO Nanoparticles Synthesis: Antibacterial Assay and Photocatalytic Activities. *Waste Biomass Valor* (2024). <https://doi.org/10.1007/s12649-024-02773-0>.

PUBLISHED CONFERENCE PAPER

1. Dr. Pradip Kumar Biswas*, Md. Sah Alam, Md. Shohel Rana, Md. Imam Sohel Hossain, Md. Shams Shahriar, Md. Aminur Rahman and Dr. Mohammad Nazim Zaman, Potentialities of the valuable heavy minerals in the river sediments of Bangladesh. March 2024, BCSIR Congress-2023.
2. Shahriar, M.S., Kendrick, M.A. and Maunder, B.L., 2024, August. Halogen enrichment in Mariana forearc serpentinites. In 2024 Goldschmidt Conference. *GOLDSCHMIDT*.
3. Md. Shohel Rana, Md. Shams Shahriar, Md. Sha Alam, Md. Imam Sohel Hossain, Pradip Kumar Biswas and Mohammad Nazim Zaman. Feasibility studies on river sands for foundry application in Bangladesh (Abstract only). BCSIR Congress-2023 at BCSIR, Dhaka, Bangladesh, 08-10 March 2024, pp 345.
4. Md. Nuruzzaman, Abu Yousuf, Md. Imam Sohel Hossain, Md. Sha Alam, Md. Shohel Rana, Aminur Rahman. Extraction from silica from rice straw and its application in adsorption of lead (II) from aqueous solution (Abstract only). BCSIR Congress-2023 at BCSIR, Dhaka, Bangladesh, 08-10 March 2024, pp 125.
5. Pradip Biswas, Md. Sha Alam, Md. Shohel Rana, Md. Imam Sohel Hossain, Md Shams Shahriar, Md. Aminur Rahman, Mohammad Nazim Zaman. Potentialities of the valuable heavy minerals in the river sediments of Bangladesh. (Abstract only). BCSIR Congress-2023 at BCSIR, Dhaka, Bangladesh, 08-10 March 2024, pp 345.
6. M. Nakib Hossen; M. Mostafizur Rahman; Sharmin Islam; M. Sarwar Jahan; Alkaline treatment and fractionation of OCC for strength improvement. BCSIR Congress-2023.
7. Sharmin Sulatana, Shahid Akhter Hossain, S.M. Imamul Huq, Md. Enayet Hossain and Md. Imam Sohel Hossain. Assessing the Suitability fo the Paper Mill Effluent as Irrigation Water. *The Role of Science and Technology Towards 4IR*, 2023 October 05-06, Rajshahi, Bangladesh, pp.134.
8. Sharmin Sulatana, Shahid Akhter Hossain, S.M. Imamul Huq, Md. Imam Sohel Hossain and Md. Enayet Hossain. A Comprehensive Assessment of Paper Mill Wastewater on Rice Production in Bangladesh. BCSIR Congress-2023, 2024 March 08-10, Dhaka, Bangladesh, pp.345.

9. Md. Imam Sohel Hossain, Pradip Kumar Biswas, Mst. Shanjida Sultana and Mohammad Nazim Zaman. Finding a Suitable Groundwater Source to Secure Safe and Clean Drinking Water in Raipara, Rajshahi, Bangladesh. *The Role of Science and Technology Towards 4IR*, 2023 October 05-06, Rajshahi, Bangladesh, pp.110.

PUBLISHED BOOK CHAPTERS

1. Nuruzzaman, M., Ahmed, F., Kadri, H. J., & Mondal, M. I. H. (2024). Cotton and other cellulose fibres for comfort smart clothing. In Elsevier eBooks (pp. 65–108). <https://doi.org/10.1016/b978-0-443-15471-3.00014-5>

ACCEPTED PROCESS

1. Sultana, M. S., Biswas, P. K., Zaman, M. N. and Hossain, M.I.S., “Development of sustainable and environment-friendly pavement blocks with rice husk ash” Bangladesh Council of Scientific and Industrial Research. (2023) Ref No: 39.02.0000.043.37.920.22/09, Date:16.07.2023.
2. Tabassum, S., Debnath, S. C., Siddika, A., Ajam, M. S., Yeasmin, N., “A Process of an indoor Solar Cooker for Small Scale Application”. Bangladesh Council of Scientific and Industrial Research. (2023) Ref No:39.02.0000.043.37.922.22/363 & date: 14.11.2023.

ATTENDED IN TRAINING COURSE

1. Md. Shohel Rana, SSO; Md. Nuruzzaman, SO attended In-house training on “Simultaneous Thermal Analyzer (STA)” from 15-19 October 2023 by BCSIR, Dhaka.
2. Md. Nuruzzaman, SO; Md. Shohel Rana, SSO, attended In-house training on “Field Emission Scanning Electron Microscopy (FE-SEM) with WDS and EDS and Automated Mineral Analyzer” from 26-30 November 2023 by IMMM at Joypurhat.
3. Md. Imam Sohel Hossain, SSO attended In-house training on “Atomic Absorption Spectrophotometer” from 21-25 April 2024 by PP and PDC at BCSIR, Dhaka.
4. Md. Ripaj Uddin, SO; Md. Hasnain Mustak, SO attended In-house training on “X-ray Diffractometer” from November (26-30), 2023, IGCR, BCSIR, Dhaka.
5. Most. Nilufa Yeasmin, SO; Hayatullah, SO attended In-house training on “Field Emission Scanning Electron Microscopy (FE-SEM)” from 26-30 May 2024 by BTRI, BCSIR, Dhaka
6. Hayatullah, SO attended training on “Rigaku X-Ray Fluorescent Spectroscopy, Model ZXS Primus” 28th September 2023 by IMMM, BCSIR, Joypurhat.
7. Abdul Kader Fakir, SO; Md. Hasnain Mustak, SO; Hayatullah, SO attended In-house training on “Atomic Absorption Spectrophotometer” from October (8-12), 2023, IMMM, BCSIR, Joypurhat
8. Md. Hasnain Mustak, SO; Md. Nuruzzaman, SO; Abdul Kader Fakir, SO; Nadim Munna, SO; Md. Nakib Hossen, SO; attended In-house training on “Simultaneous Thermal Analyzer” May 27, 2024 IMMM, BCSIR, Joypurhat
9. Md. Nakib Hossen, SO; Md. Hasnain Mustak, SO; Most. Nilufa Yeasmin, SO; Md. Nuruzzaman, SO; Abdul Kader Fakir, SO; Hayatullah, SO; Nadim Munna, SO; attended In-house training on “X-ray Diffractometer” June 25, 2024 IMMM, BCSIR, Joypurhat

SPONSORED R&D PROJECT

Development of Sustainable and environment-friendly Pavement blocks with Rice husk ash. Mst. Shanjida Sultana, Dr. Mohammad Nazim Zaman, Pradip Kumar Biswas, Md. Imam Sohel Hossain.

ACADEMIC RESEARCH GUIDANCE/ SUPERVISION

S.N	Title of Research	Research Category	Name of student	Name of academic Institution	Name of supervisors in BCSIR
1.	Possibility of textile dye removal by silica-based composites synthesized from river sand using a green physicochemical route.	M.Sc.	Chaity Ghosh	Department of Geology and Mining, Rajshahi University	Dr. Pradip Kumar Biswas, PSO, IMMM, BCSIR, Joypurhat
2.	Grain Size Analysis of Madhupur Clay Formation, Bengal Basin, Bangladesh	M.Sc.	Md. Saurav Ruhani	Department of Geological Sciences, Jahangirnagar University	Md. Sha Alam, SSO, IMMM, BCSIR, Joypurhat
3.	Elemental Analysis of Rare Earth Elements of River Jamuna Basin Sand: Environmental, Anthropogenic, and Socio Economic Perspectives	B.Sc.	Major Niharika Ferdous, Major Arna Dhar	Department of Nuclear Science and Engineering, Military Institute of Science and technology	Md. Shohel Rana, SSO, IMMM, BCSIR, Joypurhat
4.	Study and Mineralogical Analysis of Zr and Ti-rich Minerals Found in the Sand of Cox's Bazar Coastal Area,	B.Sc.	Arijit Saha Ayon, Md. Abdul Hakim Selim	Department of Nuclear Science and Engineering, Military Institute of Science and technology	Md. Shohel Rana, SSO, IMMM, BCSIR, Joypurhat
5.	Textural and Petrographic Characterization of Sandstone Facies and Sediment Routing in the Neogene Surma Group Sandstones of Sitakund and Sylhet Region, Bangladesh	MS	Khondokar Arifuzzaman Nur	Department of Geology, Dhaka University	Md. Imam Sohel Hossain, SSO, IMMM, BCSIR, Joypurhat

TRAINING PROGRAM

In addition to research activities and analytical services, each year the institute arranges several training programs on instrumental methods relevant to Mining, Mineralogy, and Metallurgical fields.

SEMINAR ON R&D ACTIVITIES

Each year the Institute of Mining, Mineralogy and Metallurgy arranges seminars on Research and Development activities every month. There are number of seminars on R&D activities have been arranged in this period. In the seminars, generally, scientists and engineers present the methodology, progress, and achievements of their ongoing R&D projects

MEETING WITH STAKEHOLDERS/WORKSHOP

Every year IMMM arranges a meeting with its stakeholders to exchange the views of the researchers. Stakeholders including businessmen, entrepreneurs, and journalists discuss and express their views with scientists about the leased-out processes and the market demand for national and international aspects.



Stakeholders Meeting

BCSIR SCIENTIFIC AND INDUSTRIAL TECHNOLOGY FAIR

Every calendar year IMMM arranges a science fair titled 'BCSIR Science and Industry-Technology Fair' involving the students of High schools and Colleges from different districts of the North Bengal region. The participants display their scientific talents in this fair which is funded by the Bangladesh Council of Scientific and Industrial Research (BCSIR), Dhaka, Bangladesh. In this fiscal year BCSIR Science & Industrial Technology Fair were held during January 2024.

ANALYTICAL PROBLEM SOLVED

This institute is engaged in the analysis of core samples of the nationally important Padma Multipurpose Bridge project from Foundation Consultation Limited. Mineral separation, mineralogical and geochemical analysis of the samples of Premier Minerals Ltd, Carbon Mining Co. Ltd, Getco Mining, Institute of Water Modeling, Samof exploration and industries like Nasir Glass In., Padma Feed and Chicks, Bengle Ceramics, etc., and different government organizations such as GSB, RAB, Customs, etc., have been analyzed. The analytical service of tensile strength testing of MS rod has been done which was given by LGED, Municipality, Upazila Parishad of Joypurhat, and Naogaon, Districts, etc. During the year about 60 analytical services were provided by different divisions of IMMM. We mainly analyze and solve the following problems with their relevant instruments:

1. Compositional analysis of rocks, sand, minerals, ceramics, etc. using WD-XRF
2. Phase determination of solids using XRD
3. Analysis of aqueous solutions using AAS & ICP-MS
4. Micro-morphological & compositional analysis of rocks, sand, minerals and materials using FE-SEM
5. Tensile strength testing of MS rods using UTM
6. Mineral separation using IRMS, EPS, Flotation Cell, and Isodynamic separator
7. CHNSO analysis of carbonaceous matter using Elemental Analyzer
8. Determination of the Calorific value of carbonaceous matter using a bomb calorimeter
9. Particle size analysis using laser diffraction
10. The compressive modulus of rocks using automatic rock testing apparatus
11. Proximate analysis of carbonaceous materials

MEMORABLE PHOTOGRAPHS



Pre-assessment Meeting for ISO Accreditation



National Science and Technology Fair-2024



Visit of Md. Delowar Hossain Member (Admin), BCSIR.
10 December 2023



International Mother Language Day-2024 Celebration



Visit of Rekha Rani Balo (Additional Secretary) Ministry of Science & Technology
on 30 August 2023



FE-SEM Training



National Independence Day-2024 Celebration



Mobile Science Exhibition-BCSIR



World Environment Day-2024



Martyred Intellectuals Day-2023



BCSIR Science & Technology Fair



XRD Training



Victory Day-2023 Celebration



STA Training



Froth Floatation Cell and Cross Flow Operation



AAS sample preparation



R&D Progress Monitoring

KEY INSTRUMENTS UTILIZED IN RESEARCH AND ANALYTICAL APPLICATIONS



Model: MG6.3, HG10i
Brand: Mineral Technologies

Origin: Australia

Spirals are gravity concentrators used for the separation of heavy minerals like ilmenite, rutile, zircon, garnet, and monazite, etc. from light minerals like quartz and feldspar.



Automated Mineral Liberation Analyser includes special software packages with SEM with WDX and EDX/S

Model: Sigma 300 FESEM
Brand: Carl Zeiss Microscopy Ltd.
Origin: UK

Used to analyze minerals phases, textural studies & image analysis by EDS automation for ore characterization, process optimization, and search for metallic and non-metallic minerals, industrial minerals, precious metals, and rare earth, etc.



Electrostatic Plate Separator, Model : C162-101

Brand Name and Country of Origin: Carrara, Australia

Used For: The mineral separation from river sand and grinded hard rock of three R&D projects of IMMM has been carried out.



Induced Roll Magnetic Separator, Model: MIH(13)111-5

Brand Name and Country of Origin: Autotec, USA

Used For: The mineral separation from river sand and ground hard rock of three R&D projects of IMMM has been carried out.



Thin section system, Model: 381460256

Brand Name and Country of Origin: Petrothin, BUEHLER, USA

Used For: Cutting the thin section of rock and minerals for petrological sample analysis is done by this unit.



Grinder Polisher, Model: 496050

Brand Name and Country of Origin: Buehler USA

Used For: The thin section slide of rock and minerals for petrological sample analysis by polarizing microscope is prepared by this unit. The petrological slide for 4 students from the University of Rajshahi for their academic research has been prepared.



Polarizing Microscope, Model: ML 9300

Brand Name and Country of Origin: MEIJI Japan

Used For: Mineral identification, Grain counting of different R&D projects, and academic research for university students have been done.



X-ray Fluorescence Spectrometer (XRF), Model: Rigaku ZXS Primus

Brand Name and Country of Origin: Rigaku, Japan

Used For: Elemental analysis of different products and raw materials of 13 R&D projects of IMMM and a few R&D projects of BCSIR, research samples of the students of different universities have been carried out by this machine

BUDGET ALLOCATION AND EXPENDITURE IN 2023-2024

Sector Name	Budget Allocation 2023-2024	Total Expenditure 2023-2024	Total Income 2023-2024
Pay and Allowance	2,56,19,050.00	2,44,79,482.00	11,30,547.00
Supply and Services (R&D) and others, Municipal and Land development taxes	2,42,49,056.00	2,20,56,906.00	-
Repair and Maintenance	13,25,000.00	10,32,901.00	-
Capital Expenditure	4,50,000.00	1,99,273.00	-
Analytical Service Render	-	-	7,41,000.00
Total	5,16,43,106.00	4,77,68,562.00	18,71,547.00

LIST OF THE DIRECTORS WORKED IN IMMM

SL. No.	Name	Duration	
		From	To
1.	Dr. M. Sanwar Hossain Mondol (Project Director)	07-01-2001	22-09-2005
2.	Dr. Md. Yunus Miah (Project Director)	23-09-2005	31-03-2009
3.	Dr. Md. Yunus Miah (Director-in-charge)	01-04-2009	05-08-2009
4.	Dr. Md. Yunus Miah (Officer- in-charge)	06-08-2009	05-08-2010
5.	Dr. Smarajit Kumar Roy (Director)	06-08-2009	17-10-2010
6.	Mr. Sudhangshu Kumar Roy (Director- in- charge)	18-03-2010	08-03-2011
7.	Mr Sudhangshu Kumar Roy (Director)	09-03-2011	02-07-2011
8.	Mrs. Mahfuza Khatun (Director- in- charge)	03-07-2011	18-10-2011
9.	Md. Shahhidul Islam (Director-in-charge)	19-10-2011	18-04-2012
10.	Dr. Md. Zahurul Haque (Director- in- charge)	19-04-2011	06-06-2012
11.	Dr. Abdus Samad (Director-in-charge)	07-06-2012	19-08-2013
12.	Mr. Md. Moyazem Hossain (Director)	20-08-2013	23-02-2014
13.	Dr. Md. Abdul Hai (Director-in-charge)	24-02-2014	18-05-2014
14.	Dr. Mohammad Nazim Zaman (Director-in-charge)	10-05-2014	03-03-2024
15.	Dr. Md. Abul Kashem (Director-addl. charge)	04-03-2024	11-09-2024
16.	John Liton Munshi (Director-addl. charge)	12-09-2024	Present

MANPOWER

Research Wing



Name	John Liton Munshi
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John Liton Munshi earned his B.Sc. and MS. Degree in Botany from the university of Dhaka. He is specialized in Biotechnology, industrial algae farming and its bi-products. He has authorized or co-authored 25 publications. He is a life member of BAS, BAAS and NITUB.



Name	Dr. Mohammad Nazim Zaman
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Dr Mohammad Nazim Zaman is a distinguished mineralogist and researcher, completing his B.Sc. and M.Sc. in Geology and Mining at the University of Rajshahi, he subsequently obtained his Ph.D. in 2002. Dr. Zaman boasts a prolific academic record, with 64 research articles and book chapters along the two patents and five processes to his credit. Dr. Mohammad Nazim Zaman's career exemplifies a synthesis of scientific excellence and practical innovation, significantly advancing mineral research in Bangladesh while promoting sustainable resource management.



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Dr. Md. Abdus Salam is an Academician, researcher and Project director of the Hydrogen Energy Laboratory, BCSIR. He has obtained PhD in Chemical Engineering from Universiti Teknologi PETRONAS, Malaysia. Dr. Salam has published more than 75 high-impact journals publications. He has successfully completed more than 15 (Fifteen) national and international R&D projects along with an ADP project (Bangladesh GoB funded ADP/2019-2022) under the Ministry of Science & Technology, Bangladesh.



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Dr. Aminur Rahman was recently awarded PhD (Applied Chemistry) at RMIT University, Melbourne, Australia on Potentiality of mineral sands exploitation from river sand of Bangladesh. He graduated with honors' (4 years) in Geology and obtained MS in Geology, Petroleum Geology and Geophysics from the University of Dhaka in the year 2006. His expertise is on mineral sand characterization and processing of river sands and beach sands. He has published 30 research articles, 2 books and 8 conference papers.



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Dr. Pradip Kumar Biswas completed MSc in 2002 (held in 2005) from the Department of Geology & Mining, University of Rajshahi. Dr. Biswas was awarded PhD from the same university on "Economic evaluation of mineral sands of the Tista river basin, Bangladesh". He has expertise on evaluation of spirals for mineral sands, colored stone and gem identification, ore mineralogy and mining. So far, he has published 39 research articles in different journals, 3 international books and developed 5 processes along with 1 patent.



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Mst. Kamrun Nahar is currently working as a Principal Scientific Officer in Institute of Mining, Mineralogy and Metallurgy, BCSIR, Joypurhat. She has completed her B.Sc. and M.Sc. in Applied Chemistry and Chemical Engineering from Rajshahi University. At present, she is in deputation for her PhD program abroad.



Name	Nahid Jahan (Attached-PP & PDC)
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Nahid Jahan has earned her MSc Engineering degree from Norwegian University of Science and Technology (NTNU) in Petroleum Engineering. Her research interest covers Process development in laboratory scale, bench scale or pilot scale. She has special interest in waste water treatment process and essential oil production. She has authored 22 international publications.



Name	Dr. Toufiq Ahmed
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Dr. Toufiq Ahmed is a promising engineer and researcher. Dr. Ahmed obtained his B.Sc. and M.Sc. degrees in Applied Chemistry from University of Dhaka. He further pursued his PhD at Yokohama National University in Japan, where his research focused on advanced chemical engineering techniques. Dr. Ahmed has authored 10 research articles and book chapters, reflecting his substantial contributions to the global body of scientific knowledge.



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Dr. Sharmin Sultana is a researcher specializing in soil and environmental chemistry, wastewater treatment, and sustainable resource utilization. She has completed her graduation in Soil, Water and Environment and post-graduation in Water Science (Thesis group) from the University of Dhaka. She has completed her PhD from the University of Dhaka entitled, "Assessing the Usability of Three Different Treated Wastewater for Irrigation in Rice Production." She has authored 9 international publications.



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Mst. Shanjida Sultana is doing her PhD (Applied Chemistry) at RMIT University, Australia since 2023. Environmental pollution, arsenic mobilization mechanism, waste (Rice husk ash fly ash or others) utilization are some of her field of expertise. She has completed her MS in Soil, water and Environment (Environmental science) from the University of Dhaka. She has authored 15 publications in international reputed journals.



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Dr. Md. Khairul Islam a Senior Engineer (R&D Metallurgy). He holds a PhD from RMIT University, conducted in collaboration with CSIRO, focusing on recovering valuable metals from e-waste using pyrometallurgical techniques and studying slag chemistry. He accomplished MSc and BSc in Materials and Metallurgical Engineering from Bangladesh University of Engineering and Technology (BUET), Dhaka. His expertise lies in e-waste processing, metal recycling, and alloy development. He has authored 20 scientific articles in international reputed journals.

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Administrative Wing:

Sl No.	Name	Designation
1	Md. Minhaz Sahed Khan Rizvee	Deputy Director, Finance
2	Mohammad Al Mamun Subrata	Administrative Officer
3	Md. Faruk Azam	P.A. to Director
4	Md. Hafizur Rahman	Steno-Typist Cum Computer Operator
5	Md. Fazlur Rahman	UDA
6	Md. Mizanur Rahman	Office Assitant cum computer Operator
7	Md. Hasanur Rahman	Office Assitant cum computer Operator
8	Md. Mohibullah	Library Assistant
9	Md. Rasel Kabir	Library Assistant/Book Binder