

## Department of Chemistry

### Industry-Institute Lecture Report

Department of Chemistry has organized one Industry-Institute Lecture on the topic “Innovation- An essential road to build career economy” on 06/09/2024 under ICC-NIT Raipur. The Lecture was delivered by **Dr. Amit Chatterjee, Chief Research & Development Officer, Vedanta Ltd., Aluminium Business, Jharsuguda, Odisha, India.**

The lecture started with a short welcome address by Dr. S. P. Mahapatra, Coordinator, ICC-Chemistry and then expert delivered his complete presentation in Online mode and covered various aspects of Aluminium Industry, Research and Development such as Raw materials of Aluminium, Waste products-reuse-recycling of Aluminium, Characterizations of different outputs, Recovery of Graphite and high commercial materials from waste, Li-ion Battery and energy storage applications, Critical minerals, Use of dross slag, Cobalt and its recovery, Red mud utilization and recovery, Conversion of CO<sub>2</sub> to valuable products and Consumption, applications of Fly Ash and benefits of circular economy etc..


Around 50-60 M.Sc. students and Research Scholars have attended the online Industry-Institute Lecture along with faculty members of Department of Chemistry. Finally, the expert also cleared up the queries raised by the students and faculty members in a very interesting and technical manner. In addition to this, the expert also committed M.Sc. students to allow for Summer Internship program and encouraged Ph.D. students to enhance their research for diversified applications.

The lecture was completed with a Vote of Thanks to Expert by Dr. T. Maharana, HOD, Chemistry.

# Industry-Institute Lecture Photos

Amritha Charities (Presenting)

**"Innovation- An essential road to build circular economy"**  
Industry-Institute Lecture under IGC-NIT Raipur



Vedanta Ltd. Alumina Refinery, Bhadravathi, Karnataka

2:37 AM | Mr. Sankar-yhq

Amritha Charities (Presenting)

**Vedanta Ltd- Aluminum Business, Research & Development**

**Areas of Focus**

- Aluminum
- Aluminum Oxide
- Aluminum Hydroxide
- Aluminum Chloride

**Our Collaborators (Institutions)**

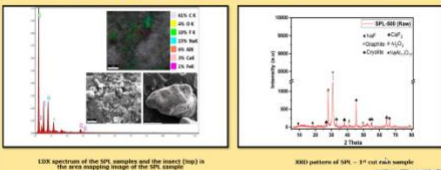
- IIIT Bombay
- IIIT Hyderabad
- IIIT UTM
- IIIT Delhi
- IIIT Kharagpur
- CEERI NHU
- CEERI UMPT
- Jadavpur University
- IICT Bangalore



2:42 AM | Mr. Sankar-yhq

Amritha Charities (Presenting)

**Characterization of SPL-1<sup>st</sup> cut and SBD Specimens**



EDS spectra of the SPL specimen and the mixed (top) in the area mapping image of the SPL sample

SBD pattern of SPL - 1<sup>st</sup> cut - mix sample

Graphite has a large market in India. It is one of the demanding area. It is used for construction of lithium battery.

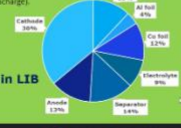
2:57 AM | Mr. Sankar-yhq

Amritha Charities (Presenting)

**What advantages do Lithium Ion Batteries have over other batteries?**

- Lithium ion batteries are smaller and more powerful than other batteries...
- Lithium ion batteries stand up well to repeated charging and discharging...
- Lithium ion batteries can be fast-charging...
- Lithium ion batteries support wireless charging...
- Lithium ion batteries are resistant to natural discharge (self discharge).

**Configurations of Lithium Ion Battery**



**Material Cost in LIB**


- Graphite: 10%
- Aluminum: 1.3%
- Aluminum Oxide: 4%
- Aluminum Hydroxide: 1.2%
- Aluminum Chloride: 8%
- Separator: 14%
- Electrolyte: 1.3%
- Current Collector: 1.3%

2:58 AM | Mr. Sankar-yhq

Amritha Charities (Presenting)

**Critical Minerals – Graphite for energy storage**

- Graphite is one among 30 critical minerals for applications in anode of LI battery.
- Critical minerals are essential for the functioning of modern technologies and economies and at risk of disruption to their supply chains.
- Global economic and technological changes have created a strong demand for these minerals to meet the economic and sustainable development goals (SDG).
- According to the International Energy Agency (IEA), "the average amount of minerals required for a new power unit has increased by 50% since 2010 since the share of renewables in new investment has risen" (IEA, 2021).



01 Lack of investment in exploration activities

02 Inadequate infrastructure facilities

03 Procedural and permit delays in mining operation

04 Land acquisition issues

05 Shortage of skilled human capital, lack of sustainability

2:59 AM | Mr. Sankar-yhq

Amritha Charities (Presenting)

**Red Mud to Recover Values**



Red mud processing flow: Grinding → Purification → Drying → Roasting (900°C, 3h) → Grinding → Leaching (95°C, 4h) → Washing → Grinding → Industrial ATH Production.

Smelting (1650°C, 40min) → Drying → Purification → Pig Iron.

3:00 AM | Mr. Sankar-yhq

Amritha Charities (Presenting)

**Application of FLY ASH**



Applications of Fly Ash:

- Soil amendment
- Building materials
- Focus of the study
- Removal of pollutants
- Removal of heavy metals
- Synthesis of materials
- Common applications
- Building materials

3:06 AM | Mr. Sankar-yhq

Amritha Charities (Presenting)



3:06 AM | Mr. Sankar-yhq