

AN AMALTHEA '25 EVENT

REREACTION

**True innovation lies not in avoiding waste,
but in re-reacting it into worth.
Innovate by transforming waste into value.**

OFFICIAL RULEBOOK

VENUE: AB11/102

DATE: 9th November

TIME: 10 AM onwards

FEEL FREE TO CONTACT: Jayraj (63531 27793)



ABOUT THE EVENT

Re-react is a chemical case study event where the participants need to solve the problem of industrial waste management by strategically re-reacting it and utilizing it back into industry. In this event, participants will be asked to choose any one of the provided problem statements. Each problem will focus on a real-world chemical engineering challenge, such as industrial waste management, effluent treatment, energy recovery, or sustainable material reuse. Participants must ideate an innovative chemical or process-based solution, highlighting the scientific approach, feasibility, and potential impact of their idea.

Number of rounds: 2

Participant Guidelines:

- A team can consist of max 3 people.
- Round 1 to be submitted in PDF format in 2-slider format.
- Round 2 to be an offline presentation of max 9 slides in the PPT format.
- Solution to the problem statements should be low-cost.

Warning: Any sort of unethical practices will lead to disqualification.



PROBLEM STATEMENTS

Problem 1: The Foam That Refuses to Let Go

In the automotive and furniture industries, polyurethane (PU) foam is widely used for insulation, seating, and cushioning. However, its recycling remains a major challenge. There is no efficient large-scale process for recovery. The foam strongly adheres to metal parts (such as in car seats and panels), making mechanical separation and chemical processing difficult. As a result, millions of tons of PU foam waste are landfilled or incinerated annually.

Challenge:

Develop a chemical or thermal method to separate and recycle polyurethane foam from metal/composite parts. Your approach should use solvents, depolymerization, or surface treatments to break the foam-metal bond or convert the polymer into reusable intermediates (e.g., polyols, isocyanates). Focus on the reaction pathway and feasibility, not equipment design.



Problem 2: The Water That Smells of Oil

In 2017, a major refinery in Texas faced a crisis when a malfunction in its wastewater treatment system led to the unchecked discharge of oily effluent into a nearby river. Within hours, the local ecosystem began to suffer, with aquatic life suffocating from the lack of oxygen and the toxic effects of hydrocarbons. Refineries and petrochemical plants produce large amounts of oily wastewater during cooling, washing, and separation operations. This water often contains hydrocarbons, phenols, sulfides, and suspended solids that are difficult to treat through conventional biological methods.

Challenge:

Develop a chemical or physicochemical method to remove or neutralize hydrocarbon pollutants from refinery wastewater for safe reuse or discharge. Focus on scalable, simple processes like adsorption, advanced oxidation, membrane separation, or emulsion breaking.



Problem 3: The Acid That's Eating the Ground

In a battery recycling facility near Birgunj, Nepal, sulfuric acid from lead plate cleaning is often dumped into open pits, contaminating soil and groundwater. Yet, this acid could be neutralised, recovered, or converted into valuable materials like gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) or fertiliser salts through simple chemical processes.

Challenge:

Develop an innovative yet practical chemical method to neutralise or reuse waste sulfuric acid, using affordable reagents or natural materials. Your idea may include a reaction setup or basic process unit (e.g., a neutralisation reactor, crystallizer, or adsorption column). However, the focus should be on the method and reaction pathway, not detailed equipment design.



ROUND DETAILS

ROUND 1

- **ONLINE EVENT**
- **Participants need to submit the PDF of the entire solution through google form.**
- **Dates:**
Beginning– Registration begins on 1st November 2025
Submission Deadline– 7th November 2025

ROUND 2

- **OFFLINE EVENT**
- **Submissions from participants: PPT presentation (8 slides)**
- **Date: 9 Nov 2025**
- **Time: 10 AM onwards**
- **Venue: AB11/102, IIT Gandhinagar**
- **Duration: 8–10 minute Presentation**
- **Q&A**

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