Research Projects

S.No.	Sponsored Projects	Title of the Project	Completed and its value:	On-going and its value:
1	SEED Money Project (2022-2023)	Utilization of Citric Acid as Bio-based Monomer in Production of Robust Polymer	-	Rs. 98000/-
2	SEED Money Project (2020-2021)	Study on Implementation of Effective Solid Waste Management System in HICET	Rs. 60000/-	-
Applied Projects				
4	DST	Recovery of Rare Earth Minerals from Brine: Selective Recuperation using Porous Ion Sieve Nano-fiber assisted Membrane crystallization and Distillation	Rs. 48,84,000/-	
5	ICSSR	Waste to Wealth Perspective: Identifying Waste Potentials for Small Scale Business Development in Coimbatore, India	Rs. 44,5000	

Consultancy Projects

S.No.	Consultancy Projects	Title of the Project	Completed and its value:	On-going and its value:
1	Sigma Engineering Service	Thermal Analysis of Wi-Fi Enclosure using CFD	Rs. 55000/-	-
2	EGES Enviro Solution Pvt. Ltd	Effective Separation of Valuable Heavy Metals from E-Waste	-	Rs. 75000/-

Funded Projects Details

S.No.	Title of the Project	Name of the Principle Investigator/ Co-Principle Investigator	Partnered or Sponsored by	Outcome
1	Recovery and Improvement of Precious Metal Ions from E-Waste using Electrolysis Technique *(Academic Year: 2021-2022, Amount in Rs:95,000/-)*	Mr. M Dinesh Kumar & Ms. P Induja	Hindusthan College of Engineering and Technology	**Technology Transferred to HiCET**
2	Study on Implementation of Effective Solid Waste Management System in Hindusthan College of Engineering and Technology *(Academic Year: 2020-2021, Amount in Rs:60,000/-)*	Dr. Sridhar N & Dr. M Seenuvasan	Hindusthan College of Engineering and Technology	**Technology Transferred to HiCET**

A Report on Research Seed Money Project

"RECOVERY AND IMPROVEMENT OF PRECIOUS METAL IONS FROM E-WASTE USING ELECTROLYSIS TECHNIQUE"

Funded by,
Hindusthan College of Engineering and Technology
(2021-2022)

Mr. Dinesh Kumar M
Assistant Professor

Ms. Induja P
Assistant Professor

Department of Chemical Engineering, HICET

RECOVERY AND IMPROVEMENT OF PRECIOUS METAL IONS FROM E-WASTE USING ELECTROLYSIS TECHNIQUE

FIELD OF THE INVENTION

This invention is used for recovering valuable materials from e-waste, such as precious metals and rare earth elements, we can reduce the amount of waste that ends up in landfills.

OBJECTIVE OF THE INVENTION

- To recover valuable metals from e-waste and rare earth metals.
- To study on novel investigations dealing with the combinations of microwave heat treatment process followed by various leaching process with different combinations of acidic solution for E-waste samples
- To characterization these studies using SEM, SEM/EDAX, XRD, optical microscopes, Image mapping, TEM.
- To validate the experimental results with Surface Response Methodology

IMPACT TO THE SOCIETY

The impact to society from the outcome of this project;

- We can improve the environment by recovering important components from e-waste, such as rare earth elements and precious metals, and reducing the quantity of garbage that is illegally or inadvertently disposed to it.
- Recovering metals from e-waste reduces the need for new mining operations, which might have detrimental effects on the environment and society.
- Less energy is needed to recover metals from e-waste, which can lessen greenhouse gas emissions and the effects of climate change.
- The recovery of e-waste can outgrowth technical developments and advances in the study of metals, resulting in the creation of new and more effective recovery methods.
- E-waste recovery can open up business prospects, including the possibility of creating new employment and generating income from the sale of salvaged goods.
- Local communities might gain from e-waste recovery by giving them access to technology and electronic gadgets that they might not otherwise be able to buy.

STUDY ON IMPLEMENTATION OF EFFECTIVE SOLID WASTE MANAGEMENT SYSTEM IN HINDUSTHAN COLLEGE OF ENGINEERING AND TECHNOLOGY (HiCET)

Principal Investigator	: Dr. Sridhar N, Associate Professor and Head, Department of Agricultural Engineering, HiCET.
Co- Principal Investigator	: Dr. Seenuvasan M, Professor and Head, Department of Chemical Engineering, HiCET.
Status of the Project	: Completed
Funded/Supported by	: Hindusthan Educational and Charitable Trust

STATE PRIORITIES OF THE PROJECT

India faces major environmental challenges associated with waste generation and inadequate waste collection, transport, treatment and disposal. Current systems in India cannot deal with the volumes of waste generated by an increasing urban population, and this impacts on the environment and public health. The world waste production is expected to be approximately 27 billion Tonnes per year by 2050, one-third of which will come from Asia, with major contributions from China and India. There is an urgent need to develop new technology and strategy to handle solid waste management (SWM) properly, because current Solid waste management systems are inefficient with the solid waste having a negative impact on public health and environment.

By keeping these facts, the **study focused on:** Implementation of Effective Solid Waste Management System in HiCET with the following specified Objectives:

- ✓ To use solid wastes as resources and create environmental awareness.
- ✓ To generate high calorific value pellets for contributing to alternate fuel.

RESEARCH WORK CARRIED OUT IN HiCET

From HiCET campus, 74 wood samples like plant stem and 28 non-wood samples like Papers, Cardboard, grass, plant leaves and food waste have been collected and analyzed for the properties such as Moisture content, Volatile matter, Ash content and Fixed carbon through thermo-chemical conversion. Based on the results obtained, 10 samples were identified based on their calorific values for the further studies. Characterization analysis is carried out through Scanning Electron Microscope (SEM) and Thermo – Gravimetric Analysis (TGA) for the selected samples.

SELECTION OF BIOMASS BASED ON FIXED CARBON

A set of samples were selected based on fixed carbon content and blended with certain proportions. The blended sample were converted into charcoal for investigating further characterization analysis.
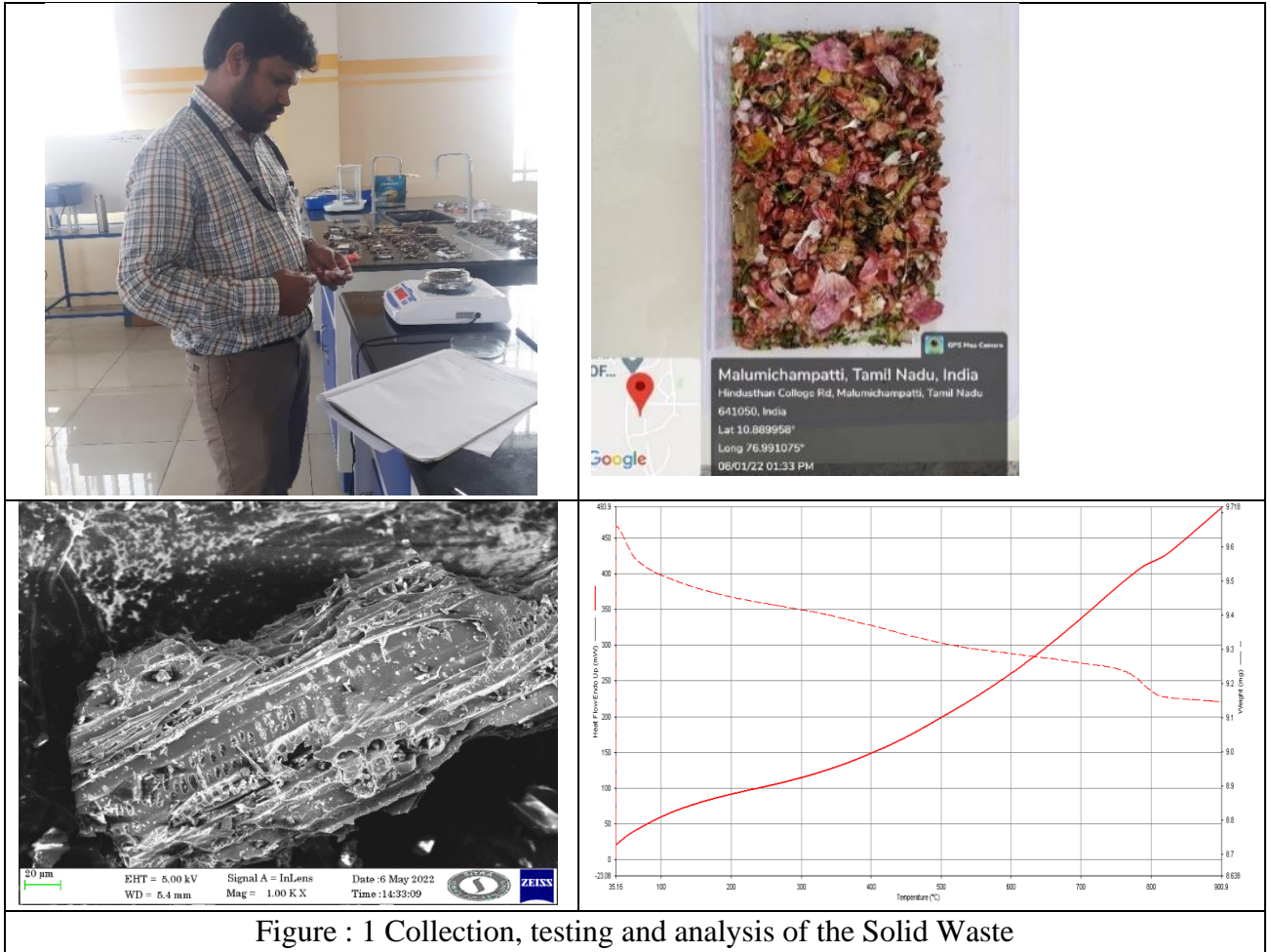
Figure : 1 Collection, testing and analysis of the Solid Waste

The thermal stability and fraction of volatile components of Sample are analyzed using TGA Analysis. From the TGA result, it is concluded that selected sample has good thermal stability. Kinetic behavior evidences that the biomass can be used for the energy recovery. The structure and the chemical Composition of selected sample was analyzed using SEM. The micro structure confirms that the sample is suitable for energy recovery purposes.

SOCIAL IMPACT OF THE PROJECT

- Reduce the negative impact on property values, and the detrimental effects on public health combine into a terrifying impact.
- Moving toward circular economies with more sustainable waste management will notably increase livability for those where waste gets dumped. Further still, it will increase capital investments and provide better outcomes for society.
- Provide evidence to policymakers, practitioners, profit and non-profit organizations about alternative SWM practices and systems, which have evolved endogenously in the wake of crises, and their appropriateness, feasibility and acceptability in particular political and sociocultural contexts.
- Alternate fuel for boiler industries and steam engines.