



**Project ID:- A7**

**Category of project:- Power System(Renewable Energy)**

## **DESIGNING AND SIMULATION OF ASYMMETRIC SUPERCAPACITOR BY USING BIOMASS MATERIALS**

### **1.OBJECTIVES:**

- To make supercapacitor made of different electrode materials (Orange peels and teak wood) and find there specific capacitance, charging and discharging graphs by simulation.
- To make Super-Capacitor using agricultural bio-waste.
- Finding alternative material which will be economical, efficient with better charge storage properties.
- To compare hardware and software process for materials.

### **2.DESRIPTION:**

#### **-INTRODUCTION:**

Supercapacitors, also known as ultracapacitors, have been gaining attention in the energy storage market due to their unique characteristics such as high power density, long cycle life, and environmentally friendly disposal. The primary technology of supercapacitors relies on charging an electrical double layer at the interface between the electrode and electrolyte, where high surface area carbons are used. The main obstacle to the widespread use of supercapacitors is their high cost compared to batteries. The most expensive component of a supercapacitor is the electrode, and reducing its cost is essential for making the device commercially viable.

#### **-METHODOLOGY:**

1. Selection of software for simulation.
2. Selection of biomass materials for SC.
3. Creating 3D geometry.
4. Creating equivalent material.
5. Optimizing physics interface.
6. Optimizing study interface.
7. Making of physical SC.
8. Comparing result with real super capacitor.

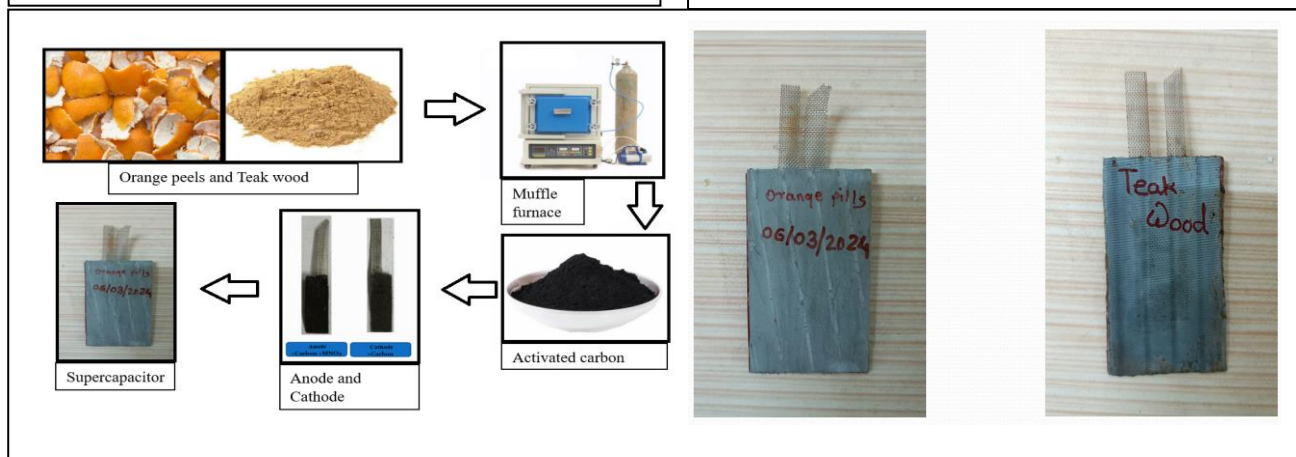
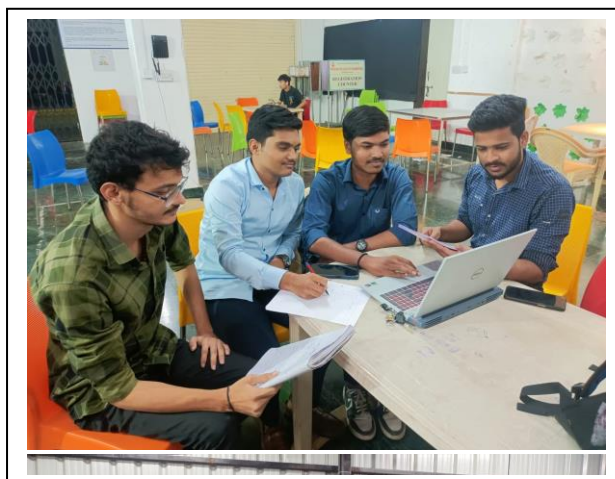
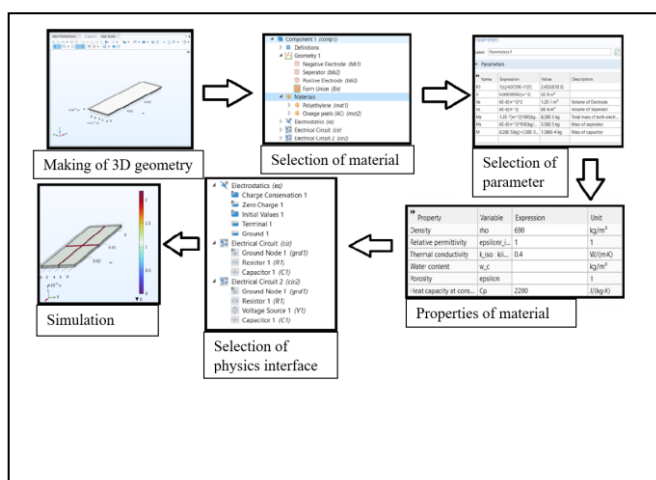
#### **-APPLICATIONS:**

- Electric Vehicles
- Energy Harvesting
- Public Transportation
- Emergency Backup Systems
- In power sources for laptops and flash in cameras

### 3.RESULTS:

Material	Software results (Based on electrostatic physics interface)	Hardware results
Orange peels	3.0547E-11 F/g	1.251 F/g
Teakwood	2.2830E-10 F/g	3.2575 F/g

### 4.PHOTOGRAPH:



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