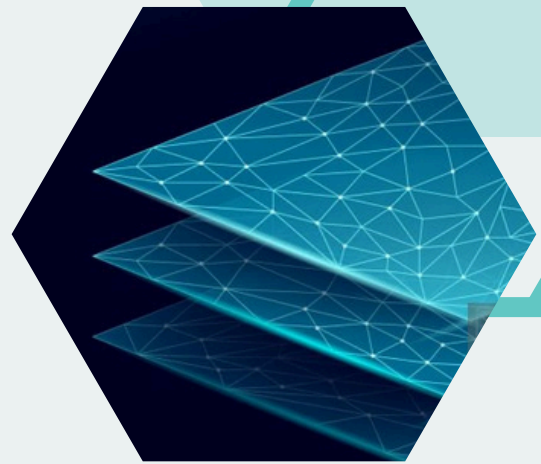


**LEPL
G.TSULUKIDZE
MINING INSTITUTE**

POLYMER COMPOSITES AND HIGH-TECH MATERIALS LABORATORY



OUR SERVICES

- ✓ Creation and Design of Composite Materials
- ✓ Evaluation of the Physical and Mechanical Properties of Composites
- ✓ Analysis of Chemical Characteristics of Composites
- ✓ Surface Characterization and Enhancement
- ✓ Biodegradability and Environmental Impact Assessment

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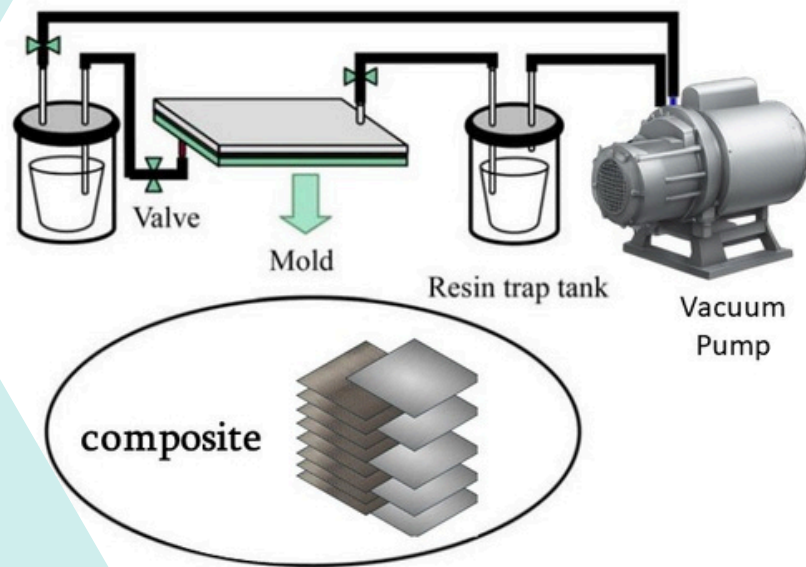
www.mining.org.ge

Creation and Design of Composite Materials

Vacuum Infusion Technology (VIT)

In the laboratory, polymer composite samples of various shapes, sizes, and compositions are prepared using vacuum infusion technology. This technique ensures the creation of uniform and high-quality composites, which are essential in various industries, including automotive, aerospace, and biomedicine. The process allows for controlled liquid flow, enhancing the mechanical properties and longevity of the composites.

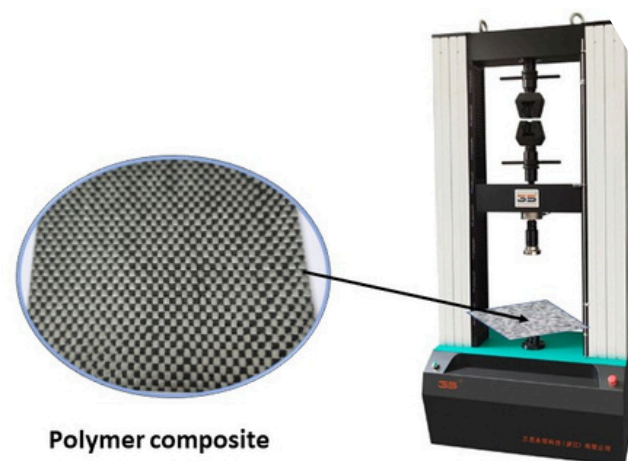
VIT



Cold Pressing Technology (CPT)

In our laboratory, this technology is utilized to create advanced polymer composites, demonstrating its effectiveness. Cold Pressing Technology (CPT) is a widely useful method for polymer composites. Its combination of energy efficiency, preservation of material properties, versatility, and ability to produce high-quality composites makes it an invaluable tool in modern manufacturing.

CPT



Evaluation of the Physical and Mechanical Properties of Composites



Digital Charpy Impact Tester

Specifications

- The pendulum energy (kJ): 1, 2, 4, 5, 7.5, 15;
- Impact velocity (m/s): 2.9, 3.5, 3.8;
- Angel accuracy: 0.01° ;
- Energy accuracy (J): 0.01.

Motorized Tension / Compression Test Stand Mark 10 ESM303

Specifications

- Max. Testing Force: 2.5kN;
- Displacement range: 457 mm;
- Speed of movement: 0.5 – 1100 mm/s;
- Discrimination of Displacement(mm): 0.01;
- Accuracy of Displacement Measure:
Over $\pm 1\%$;



Testing Machine XBD4104

Specifications

- Max. Testing Force (kN): 10;
- Discrimination of Displacement(mm): 0.01;
- Accuracy of Displacement Measure: Over $\pm 1\%$;
- Range of Speed Control (mm/min): $0.01 \sim 300$



Evaluation of the Physical and Mechanical Properties of Composites

Optical microscope - ZEISS Primotec



Specifications

Magnification capability: x50, x100, x200, x400, x1000.

Positions Turret Digital hardness tester

EBP DVK-1A-6 6

Specifications

- Test force: 50gf (0.49N), 100gf (0.98N), 200gf (1.96N), 300gf (2.94N), 500gf (4.9N), 1kgf (9.8N);
- Test Range: 1HV~2967HV
- Test Mode: HV/HK
- Loading Method: Automatic (Loading/Dwell/Unloading)



Hydraulic press - HOLZMANN WP20H

Specifications

- Holding force: 20 t
- stroke: 190 mm
- bed width: 545 mm
- Working area: 0 - 988 mm

Material Forming

Split Single-zone Tube Furnace STG-60-12



Specifications

- Vacuum degree: 10^{-3} Tor;
- Maximum temperature: 1400°C
- Heating Zone Length : 300 mm
- Continuous Temp. : 1200°C
- Heating Element: High Quality Alloy Resistance Wire (HRE)
- Temperature Precision: $\pm 1^{\circ}\text{C}$
- Thermocouple: N type

Planetary Micro Mill - PULVERISETTE 7

Specifications

- working principle: impact force
- Optimal for material type: hard, medium-hard, brittle
- Number of grinding stations: 2
- Grinding bowl sizes: 20, 45, 80 ml
- Grinding ball diameter: 0.1 - 20 mm



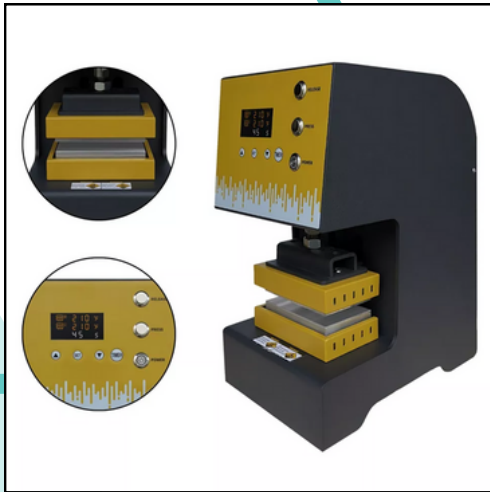
Manual cut-off machine Labotom-5 Specifications

- Size : 250 mm
- Arbor size: 32 mm
- Rotational speed (running idle): 2845 rpm (50 Hz) / 3450 rpm (60 Hz)
- Cutting capacity : 42 x 120 mm or 1.7" x 4.7"
- Corner grinding equipment, wet cutting capability



Struers

Material Forming



Thermo Press Rosineer AUTO 4-Ton

Specifications

- Force: 3600 kg
- Plates dimension: 76 x 127 mm
- Heating types: dual heating; insulated;
- Temp. Range: 180 °C

Filament Extruder BORX-JH20

Specifications

- Screw Design: Single-screw
- Screw L/D Ratio: 15:1
- Plastic Processed
- PE, PP, PVC, ABS, Polystyrene, PA, EVA, PC, FRPP/PVC, HDPE, PE/PP
- Screw diameter: 20mm
- Screw Speed: 70 rpm



3D printer anycubicKobra 2

Specifications

- Printing speed
- 300mm/s(Max.)/200mm/s(Typ)
- Operating screen
- 4.3" LCD Touch-Control Screen
- PLA/ABS/PETG/TPU



Polymer Synthesis and Study



Analytical Balances
Radwag AS 220/x
Measurement range
0.0001 - 220 g



Heating Mantles
JoanLab HMSC 1000 ml & 2000 ml
Temperature range: 23 – 300 °C



RY-2 Melting Point Apparatus RY-2
Temperature range: 23 – 300 °C
Precision: 0.1 °C



Mechanical Stirrer
Biosan MM-1000

Specifications:

- Speed control range 40 – 1000 RPM
- Max. stirring volume (water): 20 Liters
- Digital time setting: 1 minute - 96 hours



Specifications:

- Speed control range: 50-1200 RPM
- Max. stirring volume : 20 liters
- Digital time setting: 0 – 24 hours
- Maximum viscosity: 16000 mPas



Magnetic Hotplate Stirrer
Biosan MSH-300

Specifications:

- Speed control range: 250-1250 RPM
- Max. stirring volume: 15 liters
- Plate temperature regulation range: +30°C...+330°C



Digital Display Magnetic Hotplate Stirrer
JoanLab HS8 Pro

Specifications:

- Speed control range: 50-1500 RPM
- Max. stirring volume : 5 liters
- Plate temperature regulation range: 23 - 310°C

Polymer Synthesis and Study

Drying Oven Biobase BOV-V45F



Specifications

- Capacity: 45 liter
- Temperature range: 23 – 300 °C
- Temperature precision: 0.1 °C
- Energy Consumption: 1200 watt
- Weight: 39 kg

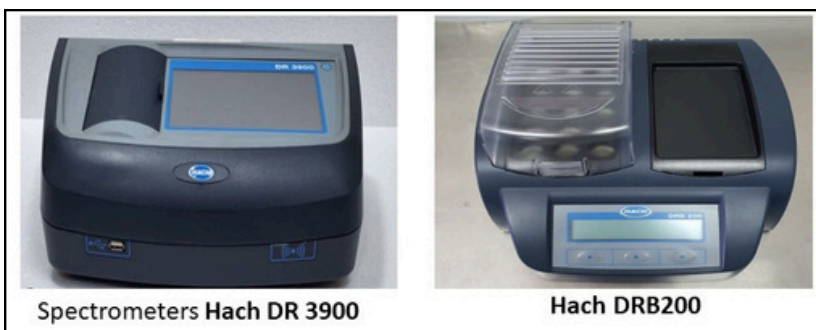
Vacuum Pump JoanLab VP-30L

Specifications

- Pumping speed:(L/min): 30 Liter/min
- Ultimate Vacuum / Negative Pressure (Mpa): 0.085
- Max Pressure / Positive Pressure(bar): 5
- Weight 1.58 kg



Spectrometers



Specifications

- Spectrum measurement range: 320 – 1100 nm

Polymer Synthesis and Study

Wqs Vibrator Laboratory Vibrating Screen

Specifications



- Operating range: ≤ 325 mesh
- Vibration frequency: 3000 times/min, 6000 times/min
- Amplitude selection: 0-3 mm, continuous adjustment
- Power supply: AC 220V \pm 22V, 50Hz \pm 1Hz
- Weight: 20 kg

Polymer
Composites
and High-Tech
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Laboratory