Biomass Pyrolysis Laboratory Profile

Our laboratory specializes in cutting-edge research and technical services in biomass pyrolysis. We focus on comprehensive experimental validation across the entire biomass resource utilization chain, offering clients integrated testing solutions—from feedstock screening and product optimization to flue gas treatment. Equipped with internationally advanced analytical instruments and standardized experimental systems, we provide reliable data support and technical assurance for R&D, process optimization, quality control, and project verification in biomass pyrolysis.

1. Core Testing Capabilities

Our core testing services cover key stages of the biomass pyrolysis process, with a focus on three critical dimensions: feedstock characterization, product performance, and gas emissions, addressing the needs of scientific research, technology transfer, and industrial production.

(1) Feedstock Testing

We perform fundamental property analysis on biomass feedstocks (e.g., straw, wood chips, agricultural & forestry residues, organic solid waste) to inform pyrolysis process design and feedstock selection.

Key Equipment: Automatic Proximate Analyzer, Elemental Analyzer.

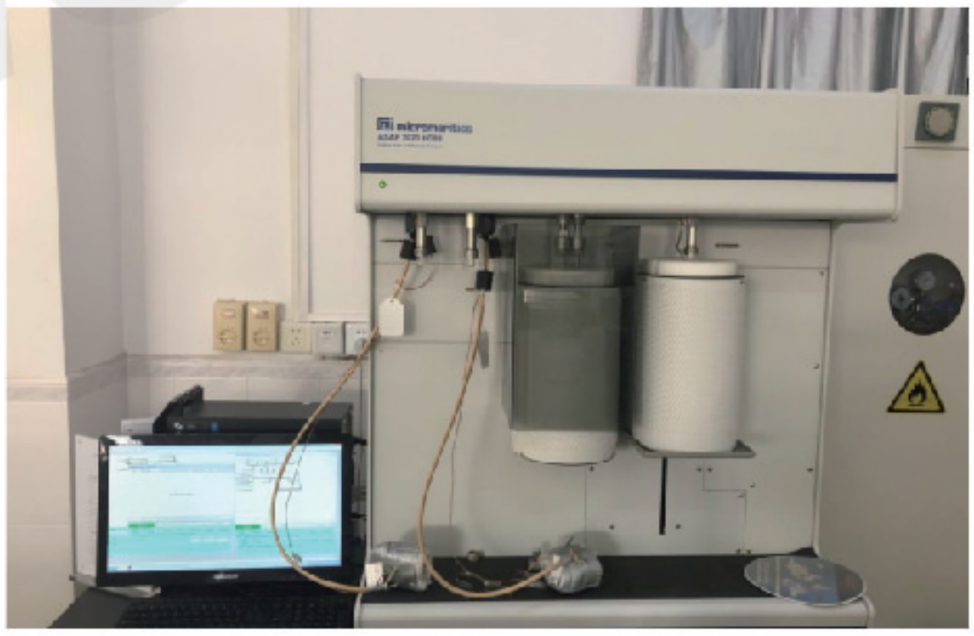
Primary Tests: Moisture, Ash, Volatile Matter, Fixed Carbon, Gross & Net Calorific Value, Elemental Composition (C, H, O, N, S), Full Proximate Analysis.

Elemental Analyzer: Used to determine the elemental composition of biochar.

(2) Biochar Physicochemical Property Testing

We conduct precise characterization of biochar—the core product of biomass pyrolysis—to analyze its physicochemical properties, supporting applications in soil amendment, carbon sequestration, adsorption materials, and energy utilization.

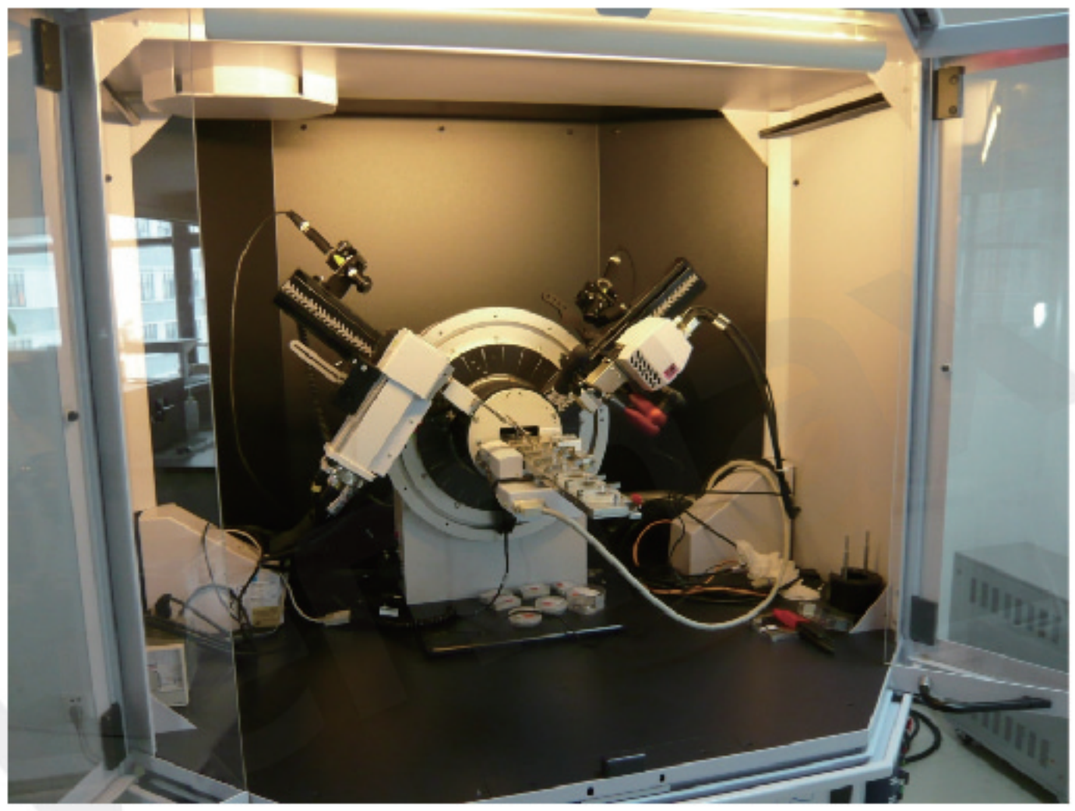
Key Equipment: BET Surface Area & Porosity Analyzer, FT-IR Spectrometer, XRD Analyzer, SEM, Elemental Analyzer, pH Meter, Zeta Potential Analyzer.



BET Surface Area and Porosity Analyzer: Measures the specific surface area and pore size distribution of biochar, including the proportion of micropores, mesopores, and macropores.

Primary Tests: Specific Surface Area, Pore Size Distribution, Surface Functional Groups, Crystal Structure, Micro-morphology, Elemental Composition, pH, Zeta Potential, Compressive Strength, Moisture Content, Ash Content, Iodine & Methylene Blue Adsorption Values.

Fourier Transform Infrared Spectroscopy (FT-IR): Analyzes the chemical composition and molecular structure of biochar through infrared radiation diffraction.



X-ray Diffractometer (XRD): Investigates the crystalline structure of biochar, with a focus on its material properties.

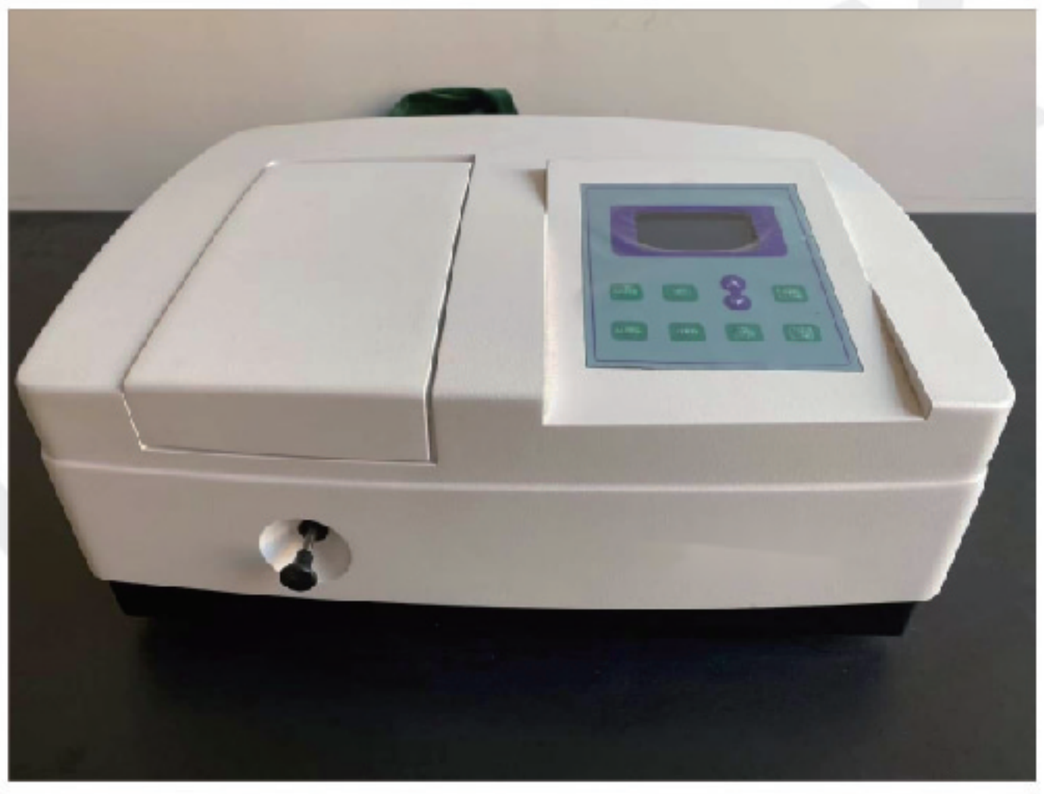
(3) Flue Gas Testing

We conduct comprehensive composition and pollutant analysis of gases generated during biomass pyrolysis, supporting flue gas treatment design, environmental compliance assessment, and emission verification.

Key Equipment: Flue Gas Analyzer, Dust Sampler, Particulate Matter Detector, Gas Chromatograph (GC), HPLC, UV-Vis Spectrophotometer.

Primary Tests: Particulate Matter (PM2.5, PM10) Concentration, Gaseous Components (SO_2, NOx, CO, CO_2, CH_4), Qualitative & Quantitative Analysis of VOCs, Tar Content & Composition, Sulfide & Nitrogen Oxide Concentrations.

Gas Chromatograph (GC): Applied in flue gas analysis to determine gaseous components.



UV-Vis Spectrophotometer: Utilized for liquid analysis, such as quantifying tar or other byproduct compositions.

2. Laboratory Advantages

1. **Advanced Equipment:** A suite of internationally renowned instruments ensures accuracy, stability, and meets multi-dimensional, high-precision testing requirements.
2. **Professional Expertise:** Our technical team has deep expertise in biomass pyrolysis, with extensive experience in experimental design, analysis, and data interpretation.
3. **Comprehensive Service:** We customize experimental protocols based on client needs, providing end-to-end services from sample preparation and testing to final reporting, suitable for both research and industrial applications.
4. **Standardized Management:** Strict adherence to ISO-compliant laboratory management systems ensures standardized, regulated processes, guaranteeing impartiality and authority of test results.

Guided by our core principles of “Precision Testing, Professional Service, and Technical Empowerment,” we are committed to advancing the innovation and industrial application of biomass pyrolysis technology. We look forward to in-depth collaboration with enterprises and research institutions worldwide to contribute to the ecosystem of biomass resource utilization.

Flue Gas Emission Test Report

Report No.: PRET-2025-0011

Test Date: August 29, 2025

Report Issue Date: November 04, 2025

Test Items and Results

This test covers key indicators such as ambient temperature, flue gas temperature, and the content of major gas components in flue gas. The specific test results are as follows:

Test Item	Test Result	Unit
Ambient Temperature	34.2	°C
Flue Gas Temperature	191.6	°C
Oxygen Content in Flue Gas	14.03	%
Carbon Monoxide (CO) Content in Flue Gas	3	ppm
Carbon Dioxide (CO_2) Content in Flue Gas	23.95	%
Nitric Oxide (NO) Contentin Flue Gas	71	ppm
Nitrogen Oxides (NOx) Content in Flue Gas	75	ppm
Sulfur Dioxide (SO_2) Content in Flue Gas	0	ppm

Data Explanation

1. The ambient temperature of 34.2°C is the atmospheric temperature around the test location, which can be used as a reference for flue gas heat dissipation analysis and judgment of the working condition of the test equipment.
2. The flue gas temperature of 191.6°C reflects the thermal state of the flue gas at the outlet of the emission source; a relatively high temperatuare may affect the operating efficiency of subsequent flue gas treatment equipment.
3. The oxygen content in flue gas is 14.03%, which can be used to convert the reference oxygen content emission concentration of pollutants in flue gas (the reference oxygen value needs to be determined in combination with specific industry emission standards).
4. The sulfur dioxide (SO_2) contentis Oppm, indicating that the emission source has a significant effect in the desulfurization process, or the sulfur content in the fuel is extremely low, which meets the low-sulfur emission requirements.
5. The nitrogen oxides (NOx) content is 75ppm, among which nitric oxide (NO) accounts for approximately 94.7%(71/75) and is the main component of NOx.