**Facilities, Equipment, and Other Resources**

**Laboratory: Renewable Materials Laboratory (CNR)**

The Renewable Materials laboratory is housed in the College of Natural Resources on the University of Idaho campus in Moscow, ID. There are 9 graduate student/researcher desks with PC computers available in the Renewable Materials laboratory office space. The Renewable Materials Program has facilities to undertake wood, bioproducts and biomaterials research in a 5,000 ft2 laboratory space (which includes chemistry labs, bioreactors, tissue culture cabinets and chambers, thermal analysis labs, chemical instrumental lab, work and lab benches, utilities, fume hoods, ovens, lumber drying kiln, environmental chambers, treatment vessels, extruder, presses, test machines, etc). Available equipment is listed in the equipment section.

Major Equipment:

* Waters Breeze HPLC/ Viscotek GPC system which has quad detection (UV-VIS, laser light scattering ( LALLS, RALLS), differential viscometer and refractive index)
* Waters HPLC systems for carbohydrate and organic acid analyses
* Dionex 1000 anion exchange analysis system
* GC-MSn (PolarisQ iontrap with EI and CI ionization modes) with pyrolysis capabilities
* GC-MS (Focus-ISQ quadrapole with EI)
* GC-TCD (Gow-Mac 350)
* LC-MSn (Thermofinnigan LCQ deca iontrap with ESI and APCI ionization)
* FTIR spectrometers (ThermoNicolet Avatar 370 and IS5) with ATR/DRIFT probes
* FT-Raman spectrometer (ThermoNicolet 960,1064 nm excitation)
* Portable Raman spectrometer (Enwave Optronics) (785 nm excitation)
* UV-VIS spectrometers (Beckman 640 and StellarNet + fiber optic probes)
* NIR spectrometer (900-1700nm; Control Development) with various fiber optic probes
* Olympus BX51 microscope (fluorescence, polarized light, DIC) with digital image capture
* SPSS, Unscramber and Design-expert statistical analysis software
* Dynamic Rheometer Bohlin CVO100 with extended temperature oven
* Differential scanning calorimeter (DSC) TA instruments model Q200 with cooling
* Dynamic mechanical analyzer (DMA) TA instruments model Q800 with cryogenic cooling
* Thermomechancial analyzer (TMA) Perkin Elmer model TMA-7
* Thermogravimetric analyzers (TGA) Perkin Elmer model TGA-7
* Differential Thermal analyzer (DTA) Perkin Elmer DTA-7
* Karl-Fischer titrator (Mettler V20)
* Laboratory hot presses 50 ton (Wabash 18”x18”), 30 ton (12”x12”), 8 ton (10”x10”)
* Instron 5500R-1137 and 5500R-1122 universal testing machines
* Leistritz co-rotating twin screw extruder (18 mm dia, LD40)
* Injection molding machine (15 Ton, Yuh-Dak model YH30)
* Q-Sun model Xe1S xenon-arc accelerated weathering chamber
* Contact angle goniometer (Pocket goniometer model 2)
* Two lumber vacuum-pressure treatment vessels (18” dia x 4ft and 8”dia x 4ft)
* Two quartz fixed-bed micro-reactors (for biofuels catalysis work) with tube furnace, metering pumps and gas mass flow controllers.
* Parr Instruments high pressure/temp reactors (model 4740, 75mL; model 4652, 500mL) plus controllers and (model 4561, 300mL) with heating/cooling control and stirrer
* 1L bioreactor STR with feed/effluent control, pH control, with aeration and DO monitoring
* Lab auger pyrolysis unit (1 kg/h) and ABRI Pilot scale auger pyrolysis unit (1/2 ton/day) with biomass dryer and grinder
* General wet chemistry lab, ovens, centrifuges, extractors, reactors, balances, fume hoods, furnaces, freeze drier, mills, vacuum system, environmental chambers, autoclave

University of Idaho also has a materials analysis facility with NMR, QTOF-MS, SEM, TEM, AFM, confocal Raman-AFM, and XRD capabilities.