The Department of Coatings and Polymeric Materials at North Dakota State University is equipped with state-of-the-art spectrometric, microscopic, testing, and application equipment utilized in coatings and polymeric materials science. This equipment is included in our service center and is available for use on a fee basis. A majority of the instrumentation has attachments or modules for advanced measuring techniques. For further information regarding our specific capabilities and/or a price list, please contact Heidi Docktor, Laboratory Manager, at (701) 231-8017 or Heidi.Docktor@ndsu.edu.

### Categories of Materials Characterization

#### Spectroscopy
- Fourier Transform Infrared Spectrometer (FTIR) - Thermo Scientific Nicolet 8700: many tech. avail. please inquire
- Ultraviolet-Visible-Near Infrared Spectrometer (UV-VIS-NIR) - Varian Cary 5000: specular and diffuse reflectance accessories
- Fluorescence Spectrometer - Jobin Yvon Horiba Fluoromax-3
- Color Spectrometer - MacBeth Color Eye 7000

#### Electrochemical
- Electrochemical Impedance Spectroscopy (EIS) and Electrochemical Noise Monitoring (ENM) - Gamry Femtostats and PC4 Potentiostats
- Scanning Vibrating Electrode Technique (SVET) - Applicable Electronics, Inc.
- Scanning Electrochemical Microscope (SECM) - CH Instruments

#### Accelerated Weathering
- Xenon Arc - Q-Lab Corporation Q-Sun 1000 chamber (2); Atlas MTS Ci4000 Weather-Ometer
- Ultraviolet - Q-Lab Corporation Q-UV SE chamber (2): one UV-A, one UV-B
- Salt Spray - Q-Lab Corporation Q-Fog CCT chamber (2): one ASTM B117, one Prohesion®

#### Surface Characterization
- Contact Angle/Surface Tension Analyzer - First Ten Angstroms: FTÅ 125
- Atomic Force Microscope (AFM) and Scanning Probe Microscope (SPM) - Veeco DI-3100 AFM: tapping, contact, nanoindentation, conductive, magnetic
- Veeco Nanoscope IIIa MultiMode

#### Mechanical
- Tensile Analysis - Instron 5545 Tensile Tester: 100N load cell, environmental chamber

#### Chromatographic/Separation Methods
- Gel Permeation Chromatography (GPC) - Waters Corporation: Module system with Refractive Index detector

#### Particle Characterization
- Dynamic Light Scattering - submicron sizing - Particle Sizing Systems Nicomp 380: 3 nm to 5 µm
- Single Particle Optical sizing - Particle Sizing Systems SPOS 780: 0.5 µm to 2500 µm
- Zeta Potential - Agilent Technologies, Colloidal Dynamics AcoustoSizer IIs

#### Other Property Techniques
- Minimum Film Formation Temperature - Gardco Rhopoint MFFT-90
- Hardness - BYK König Pendulum Hardness Tester
- Gloss - Gardco Statistical Novogloss Glossmeter

Thermal Analysis techniques (glass transition, crosslink density, etc.), Nuclear Magnetic Resonance, and many other techniques are available from the Materials Characterization Analysis Lab in the Center for Nanoscale Science and Engineering (CNSE) at NDSU. Please contact Heidi Docktor (info above) or Eric Jarabek, MCAL Manager, at (701) 231-5305 or Eric.Jarabek@ndsu.edu for more information regarding their capabilities.