



FTIRFrontiers 2026

International Symposium on Advances in Fourier Transform Infrared Spectroscopy and Its Applications



Theme: *From Molecular Vibrations to Functional Materials*

FTIRFrontiers 2026

International Symposium on Advances in Fourier Transform Infrared Spectroscopy and Its Applications

Theme: *From Molecular Vibrations to Functional Materials*

April 2-4, 2026

Symposium Overview

FTIRFrontiers 2026 highlights the latest advances in Fourier Transform Infrared Spectroscopy (FTIR), a cornerstone analytical technique across chemistry, physics, materials science, and biology. The symposium showcases innovations in instrumentation, spectral interpretation, nanoscale IR imaging, and in-situ/operando monitoring—linking fundamental vibrational analysis to applications in materials, polymers, catalysts, and biological systems. It aims to bridge classical FTIR spectroscopy with emerging technologies such as nano-FTIR, machine learning for spectral analytics, and operando chemical probing.

Symposium Tracks

Track 1 – Fundamentals and Techniques of FTIR Spectroscopy

Comprehensive coverage of FTIR principles, configurations, and advanced modalities:

- Conventional FTIR – transmission, reflection, emission
 - Attenuated Total Reflection (ATR-FTIR)
 - Diffuse Reflectance Infrared Fourier Transform (DRIFT)
 - FTIR Microscopy & Imaging – chemical mapping, 2D/3D spatial resolution
 - Nano-FTIR (AFM-IR) – nanoscale vibrational contrast
 - Time-Resolved & Temperature-Dependent FTIR
 - In-Situ / Operando FTIR – catalysis, corrosion, polymerization, battery studies
 - Fourier Transform Infrared Spectroscopic Ellipsometry (FTIR-SE)
 - Polarization-Modulated & Step-Scan FTIR
 - Cryogenic & High-Pressure FTIR Systems
-

◆ **Track 2 – FTIR in Materials Science and Nanotechnology**

- Molecular fingerprinting of semiconductors, oxides, and composites
 - FTIR for phase, crystallinity, and defect analysis
 - Characterization of hybrid materials and metal–organic frameworks (MOFs)
 - Monitoring thin-film growth and surface functionalization
 - Nano-FTIR of 2D materials, nanowires, and plasmonic structures
-

◆ **Track 3 – FTIR in Polymers and Soft-Matter Systems**

- Structural evolution during polymerization and curing
 - Spectral analysis of blends, copolymers, and additives
 - FTIR monitoring of degradation, oxidation, and aging
 - ATR-FTIR for surface modification and adhesion studies
 - Mapping molecular orientation and crosslinking in soft materials
-

◆ **Track 4 – FTIR in Biological and Environmental Sciences**

- FTIR for protein secondary structure and lipid profiling
 - Infrared microspectroscopy for tissue and cell imaging
 - Label-free molecular diagnostics
 - FTIR analysis of environmental pollutants and atmospheric gases
 - Water–biomolecule interactions and hydration dynamics
-

◆ **Track 5 – Data Analysis, AI, and Machine Learning in Infrared Spectroscopy**

- Chemometrics, PCA, and multivariate curve resolution (MCR)
- Deep learning for automated spectral classification
- Development of spectral libraries and fingerprint databases
- Data fusion: FTIR + Raman + XPS
- Advanced noise-filtering and signal-deconvolution algorithms