universidade de aveiro

TECHNICAL SERVICE

Structural Analysis of Plastic Materials

STRUCTURAL CHARACTERIZATION USING COMPLEMENTARY TECHNIQUES

KEY WORDS

CHEMICAL STRUCTURE,

CRYSTALLINITY,

DEGRADATION

DESCRIPTION

This service identifies phases, functional groups, and the degree of crystallinity in polymeric materials using X-ray Diffraction (XRD), Fourier Transform Infrared Spectroscopy (FTIR), Raman spectroscopy, and complementary techniques such as Differential Scanning Calorimetry (DSC), Thermogravimetric Analysis (TGA), UV-Vis Spectroscopy, Nuclear Magnetic Resonance (NMR), and Elemental Analysis. It studies chemical structure, molecular order, and changes induced by processing or recycling. The service includes sample preparation, spectral and diffractogram acquisition, basic interpretation, and technical support for evaluating formulations, degradation, compatibility, and performance.

AVAILABLE TECHNIQUES AND/OR EQUIPMENT

- X-ray diffractometer
- FTIR Spectrometer (ATR and Transmission)
- Raman microscope for chemical analysis and spectral mapping
- Differential scanning calorimeter and thermogravimetric analyser for thermal transitions and degradation
- UV-Vis spectrometer for optical analysis and aging
- Nuclear magnetic resonance for chemical structure
- Elemental analyzer (CHN, others)
- Sample preparation (micronization, pressing, films and pellets)
- Advanced software for spectral analysis and diffraction

APPLICATIONS

- Structural analysis to identify phases, functional groups, and crystallinity in polymeric materials
- Obtaining XRD, FTIR, Raman and NMR spectra
- Determination of compatibility and miscibility in mixtures and compounds by spectral analysis
- Elemental analysis to verify composition, purity, or presence of additives and contaminants
- Technical support for recycling studies, quality control and validation.

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