SGS POLYMER SOLUTIONS INCORPORATED

Deformulation

Deformulation services include the use of multiple analytical techniques to separate and identify compounds and structures in a material formulation

Fourier Transform Infrared Spectroscopy (FTIR)
Provides chemical composition
Detects compounds present at >5%

Gas Chromatography with Mass Spectrometry (GC-MS)
Semi-Quantitative analysis of volatile and semi-volatile organic compounds (VOCs and SVOCs)
Quantitation of VOCs and SVOCs after identification

Nuclear Magnetic Resonance Spectroscopy (NMR)
More detailed chemical composition
Copolymer ratios (if applicable)

Thermogravimetric Analysis (TGA)
Determines carbon black level
Amount of inorganic filler

Soxhlet Extraction (Sample Preparation)
This removes low molecular weight materials from a polymer system for further analysis

Scanning Electron Microscopy with Energy Dispersive Spectroscopy (SEM-EDS)
Provides elemental information of the inorganic filler

Gel Permeation Chromatography (GPC)
Measures molecular weight distribution, M_n, M_w, and M_z

Stages of a Deformulation:
1) Initial screening
2) Identification of components
3) Quantitation of components

Phenolic Antioxidants and UV Absorbers (PAO&UV Abs)
Primarily a high performance liquid chromatography (HPLC) method

Inductively Coupled Plasma with Optical Emission Spectrometry (ICP-OES)
Semi-Quantitative 65 element screen
Helps identify additives and fillers
Low detection limits (1-50 ppm for most elements)

Hindered Amine Light Stabilizers (HALS)
Size exclusion chromatography with photodiode array detection (SEC-PDA) method

Liquid Chromatography with Mass Spectrometry (LC-MS)
Detection of semi-volatile or non-volatile compounds at low levels

The approach to a deformulation will vary depending on the sample characteristics and the information needed

Consultation and Report
Our reports summarize the findings of your analyses
Our experts are available to discuss the results and answer questions

SGS Polymer Solutions Incorporated 135 Technology Drive Christiansburg, VA 24073 +1 877 961 4341 www.polymersolutions.com
ISO 17025 Accredited FDA Registered cGMP Compliant DEA Licensed
Member of the SGS Group (SGS SA)