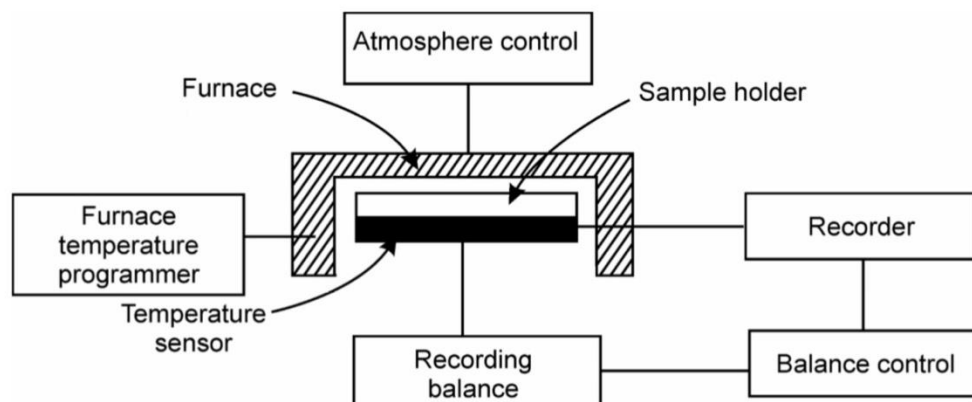


How Does Thermogravimetric Analysis Work?

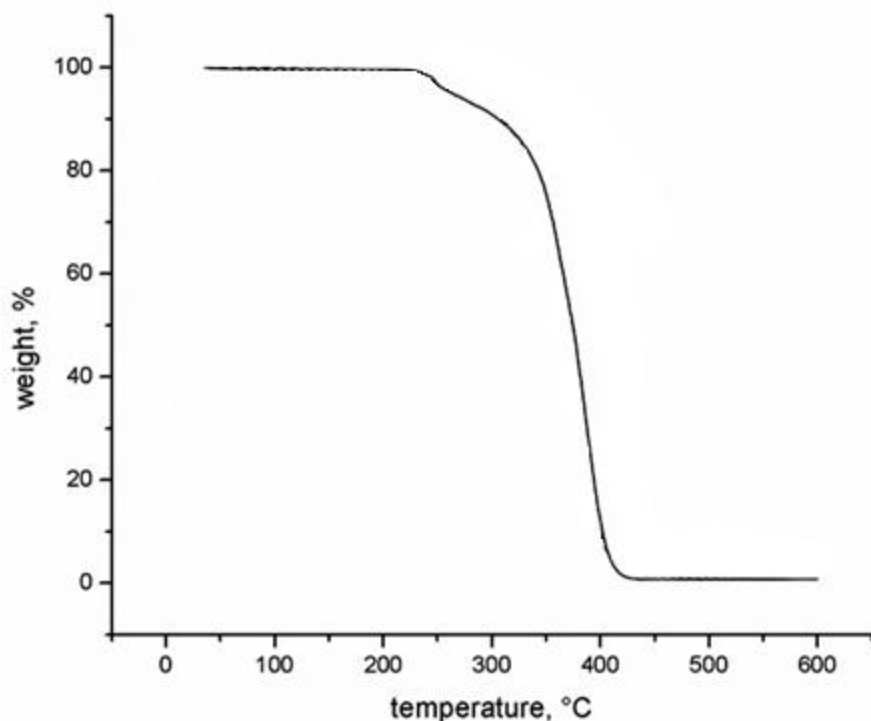
Gravimetric analysis includes a group of lab techniques in analytical chemistry that are used to determine the characteristics of a substance through a change in mass. In thermogravimetric analysis, the change in weight in relation to a change in temperature in a controlled environment is measured. Heat is used in TGA to force reactions and physical changes in materials. Thermogravimetric analysis (TGA) is a reliable method to determine endotherms, exotherms, measure oxidation processes, thermal stability, decomposition points of explosives, characteristics of polymers, solvent residues, the level of organic and inorganic components of a mixture, degradation temperatures of a material, and the absorbed moisture content of materials. Materials analyzed by thermogravimetric analysis include explosives, petroleum, chemicals, biological samples, polymers, composites, plastics, adhesives, coatings, organic materials, and pharmaceuticals.

The thermogravimetric analysis instrument usually consists of a high-precision balance and sample pan.

The pan holds the sample material and is located in a furnace or oven that is heated or cooled during the experiment. A thermocouple is used to accurately control and measure the temperature within the oven. The mass of the sample is constantly monitored during the analysis. An inert or reactive gas may be used to purge and control the environment. The analysis is performed by gradually



raising the temperature and plotting the substances weight against temperature. A computer is utilized to control the instrument and to process the output curves (temperature vs. weight).



Sample thermogram from thermogravimetric analysis indicating pyrolysis