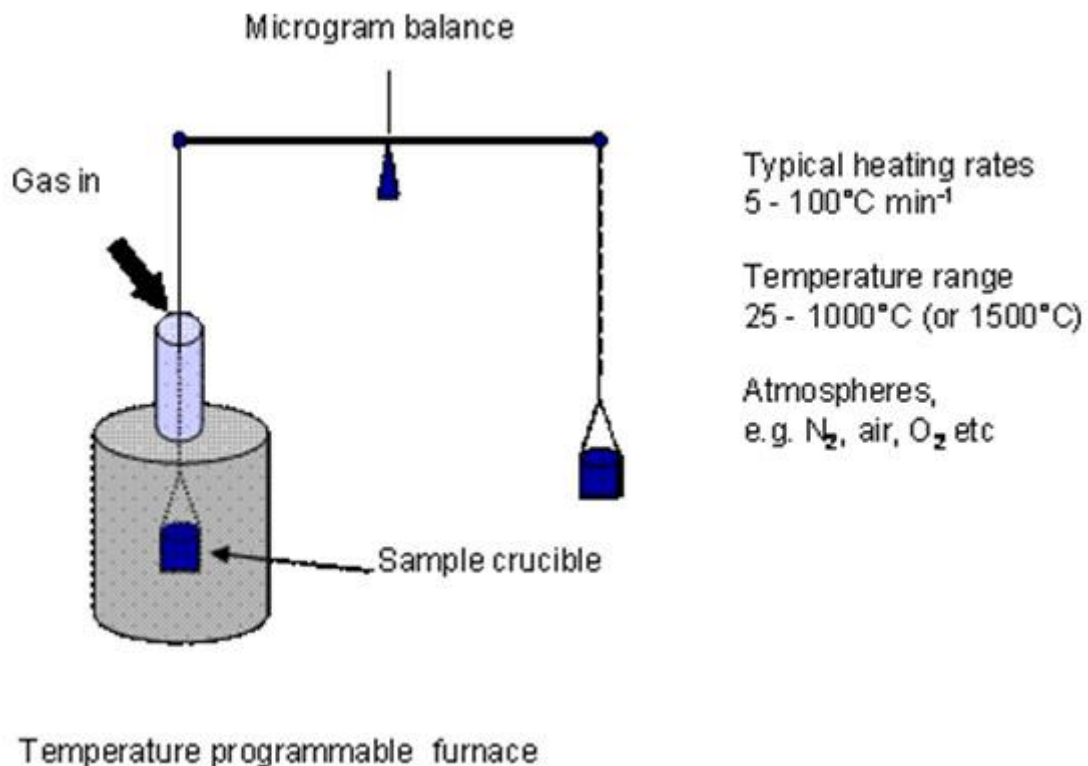


# THERMOGRAVIMETRIC ANALYSIS (TGA)

In order to understand, and alter, the behaviour of a material in a fire, it is necessary to know as much as possible about the processes of decomposition. These processes are often highly dependent on the conditions, particularly the atmosphere. The sensitivity of changes to say air, nitrogen, air/nitrogen, and even oxygen, or to heating rate or sample shape and size, can help to identify the processes occurring. Moreover, sensitivity to these parameters gives away vital clues needed to interpret the fire behaviour.

## Thermogravimetric analysis (TGA)

A sample is suspended on a highly sensitive balance over a precisely controlled furnace. Usually heating rates of 10 – 20°C/min are used to look for broad decomposition stages, while slower heating rates around 1°C/min are better for isolating individual events. Decomposition in air indicates the processes which may occur before ignition, while their absence or delay under nitrogen is indicative of a condensed phase decomposition mechanism. Sample sizes are usually kept as small as possible, within the limits of the apparatus this is usually around 5 mg per run. This reduces bulk effects and at higher heating rates avoids thermal gradients being set up within the sample.



Our instruments allow for heating rates of up to 100°C/min and temperatures up to 1000°C. In addition, the design allows for purging of corrosive gases and for rapid gas changes. For example, the carbon content of a residue may be determined by changing the atmosphere to oxygen at 800°C.