Tritium by Pyrolysis

This method is intended to measure the total tritium content, which is HTO and organically-bound tritium (OBT) combined.

A known mass of sample material is combusted in a two-stage catalytic pyrolyser. The pyrolyser consists of several independently controlled furnaces, through which a silica tube is inserted. The latter half of the silica tube carries an alumina/platinum catalyst, which is maintained in the furnace at 850ºC.

The heated catalyst oxidises all forms of tritium to HTO with high efficiency. As the sample temperature is increased, complete oxidation of carbon and organic material is achieved.

The outlet is passed into a system of water bubblers where the HTO vapour condenses and the tritium exchanges with the water in the bubblers. An aliquot of the bubbler solution is made alkaline and sodium thiosulphate is added. The water is then distilled at low temperature to remove both radioactive and non-radioactive interferences.

An aliquot of the distillate is then measured in a liquid scintillation counter to determine the tritium content. Tritiated water of known activity concentration is used to determine the counting efficiency.