

Sophisticated processing of your dental scrap

Recycle your dental scrap with Bankfield Refining Group and take advantage of our advanced analytical techniques. There are two options available to dentists when they send their dental scrap into us for processing.

1. Non-destructive XRF analysis

Using our state of the art XRF analyser, we can ascertain the precious metal content of each of your individual waste crowns and bridges. We will scan each unit individually and value your materials appropriately. When using this method there is still some degree of inaccuracy. Due to the non-destructive nature of this option, we still have to make an educated calculation that takes into consideration the weight of any tooth roots and cement that are attached to the waste crowns. We will not remove any tooth roots and cement from the crowns ourselves as this would then mean that the procedure was destructive. The upside is, if you are not happy with your quote we can return your materials to you exactly as they were, which is why we make the non-destructive option available to customers.

2. Melt and assay

The processing time of an individual melt and assay for dental scrap is 72 hours. This option offers the ultimate in accuracy.

Your scrap consignment is placed inside a crucible and heated at temperatures exceeding 1,600 °C. Copper, borax and oxidisers are added to the melt to help remove impurities and bind the metal content into a homogenous form.

The molten metal is then poured into a casting mould to form a bar. Once cooled we can take samples from the bar to ascertain a percentile of each metal that is present. Using these percentages along with the overall weight of the bar, we can calculate the total market values of each of the metals contained.

3. So, how does the XRF analyser work?

The identification of elements by X-ray methods is possible due to the characteristic radiation emitted from the inner electronic shells of



the atoms under certain conditions. The emitted quanta of radiation are X-ray photons whose specific energies permit the identification of their source atoms. To understand this phenomenon, we must first look at how X-rays are generated.

When an electron beam of high energy strikes a material, one of the results of the interaction is the emission of photons which have a broad continuum of energies. This radiation, called *bremsstrahlung*, or 'braking radiation', is the result of the deceleration of the electrons inside the material.

Another result of the interaction between the electron beam and the material is the ejection of photoelectrons from the inner shells of the atoms making up the material. These photoelectrons leave with a kinetic energy ($E-\phi$) which is the difference in energy between that of the incident particle (E) and the binding energy (ϕ) of the atomic electron. This ejected electron leaves a 'hole' in the electronic structure of the atom, and after a brief period, the atomic electrons rearrange, with an electron from a higher energy shell filling the vacancy. By way of this relaxation the atom undergoes *fluorescence*, or the emission of an X-ray photon whose energy is equal to the difference in energies of the initial and final states. Detecting this photon and measuring its energy allows us to determine the element and specific electronic transition from which it originated. Herein lies the basis for XRF spectrometry, where elements may be quantitated based on the rate of emission of their characteristic X-rays from a sample that is being excited.

In summary, we believe that we are offering dentists and lab technicians the most transparent and risk free service currently available in the UK. Due to the non-destructive nature of our XRF testing methods, you can request that your materials be sent back to you in their original condition if you are not happy with your valuation.

If you would like to take advantage of our advanced analytical services, please use the contact details below to request your FREEPOST Refining pack.

Contact us on 0845 388 6870 or email us on info@bankfieldgroup.co.uk to request your FREEPOST fully insured Refining pack.

