

Chemistry isotopes flashcard



**ASSIGN
BUSTER**

In any case, only one atomic mass can be an integer because of the difference in mass between a proton and neutron, and the fact that the sum of the particle masses for any isotope is not equal to the mass of the isotope.

There are different isotopes of the elements. The atomic weight is the average based on the proportions that they occur in naturally. For example, hydrogen comes with a single proton, a proton + a neutron, and a proton plus two neutrons.

The isotopes with the neutrons occur in very small amounts so the average weight is slightly greater than 1 .

. An isotope is a variation of the same element with a different number of neutrons in their nucleus. Isotopes can be classified as either stable or unstable. An unstable isotope undergoes radioactive decay meaning it loses energy over time while emitting radiation. For example, carbon has three isotopes and they are carbon 12, carbon 13 and carbon 14. Carbon 12 is an example of a stable isotope while carbon 14 is an example of an unstable isotope.

Unstable isotopes can release a lot of energy as they decay radioactively. Radioactivity is when an atom emits radiation such as in an unstable isotope. We can use the radioactivity of unstable elements for many things such as dating natural materials, medicinal purposes, energy use and industry use.

3.

*Lead white has been used as an artist's pigment since antiquity. It is present in almost every painting throughout the centuries and has only recently been replaced by other white pigments.

It has been possible for some years to identify trace elements contained in the lead white and to categorize the different lead isotopes. There has been little comparative research done in this area. These variations can be linked to particular locations and time periods, which would hopefully lead us to the original sources for the different lead whites.

The main focus of the project will be on the use, distribution and availability of lead white to artists and artist's suppliers in the North and South concentrating on the use of lead white in the Flemish and Italian Schools of the 17th c. With particular emphasis on the artist P. P. Rubens and his contemporaries.

The Flemish painter Pieter Paul Rubens traveled extensively during his long career as an artist. Many of his important works of art were commissioned by the great European courts and executed during his well-documented travel periods. The comparison between the working technique and the choice of materials in Rubens' studio in Antwerp and during his periods of travel abroad carries great potential to gain more insight into the studio practice of the time.

Example of Forensic Fine Art Agency: Freeman art as an investigative fine art consultancy specializing in art authentication procedures, undertake scientific investigations and the analysis and testing of fine art medium and grounds, involving a wide variety of practical forensic applications purporting

<https://assignbuster.com/chemistry-isotopes-flashcard/>

the investigation into the authenticity and accurate attribution of oil paintings, watercolors, prints, drawings & sculptures from all eras, geographical regions and time frames.

We are called upon to conduct forensic inspections, diagnostics, pigment and fiber sampling for date range identification and Carbon 14 dating alongside forensic imaging on-site throughout the world in support of art authentication procedures and attribution and legitimacy issues, legal litigation and criminal investigations.

Freeman art administrator and undertake varied practical forensic investigations of fine art: The technical analysis and identification of pigments such as, ink, paint and materials The identification and dating of paper The identification and dating of the grounds & supports upon which the work of art is produced canvas, panel, board et al. Textile, canvas dating, regional manufacture and fiber analysis Signature and inscription verification and authentication, forensic handwriting analysis and label authentication procedures. Scientists use Carbon dating for telling the age of an old object, whose origin and age cannot be determined exactly by normal means. Because of this method Chemistry has become intertwined with History, Archeology, Anthropology, and Geology.

(Poole) Many items that have been thought to come from one time have been tested and found out to actually come from a few thousand years beforehand. Places where historians believed that human civilization came to exist say, only 2, 000 years ago, have actually been proven to have had some form of human civilization more than 4, 000 years ago. Poole) Fine art

collectors have used Carbon dating to determine if a piece of antique art is actually genuine. Some have saved themselves overall thousands of dollars by testing the piece before they bought it and finding out that it is not the original, but a very clever modern copy. (Poole) But how is this done? What are the ideas behind carbon dating? Atoms of given elements have different Isotopes. Isotopes are atoms of the same element, I.

E. They have the same number of Protons and Electrons in the atom, but they have a different number of Neutrons in the nucleus, so they have different atomic masses. (Cones & Atkins) The element Carbon is in all living things, it is a basic building block for the construction of organic material. The normal molar mass of Carbon is around 12; however there are a few Carbon atoms that have a molar mass of about 13, and even fewer that have a molar mass of about 14. These atoms have one or two more neutrons in the nucleus than most Carbon atoms.

Scientists call the isotope with molar mass around 14, Carbon-14. Carbon-14 is manufactured in the upper atmosphere by the action of cosmic rays.

(Ham, Smelling, & Wielled) Ordinary nitrogen is converted into Carbon-14; however it is not a stable element. It turns out to be radioactive and decays over time. All organic material has decaying Carbon-14 in it. However, plants and animals that are still alive constantly replace the supply of carbon in their systems and so the amount of Carbon-14 in the system stays almost constant.

Once a plant or animal dies the Carbon is no longer being regenerated and so the Carbon-14 starts to decay. In this way, by measuring the amount of

Carbon-14 in the body of a prehistoric animal or plant, a scientist can deduce when the plant or animal died All radioactive materials have a half-life. If you have a certain amount of a radioactive material, its half-life is the time it takes for half of the material you started out with to decay.