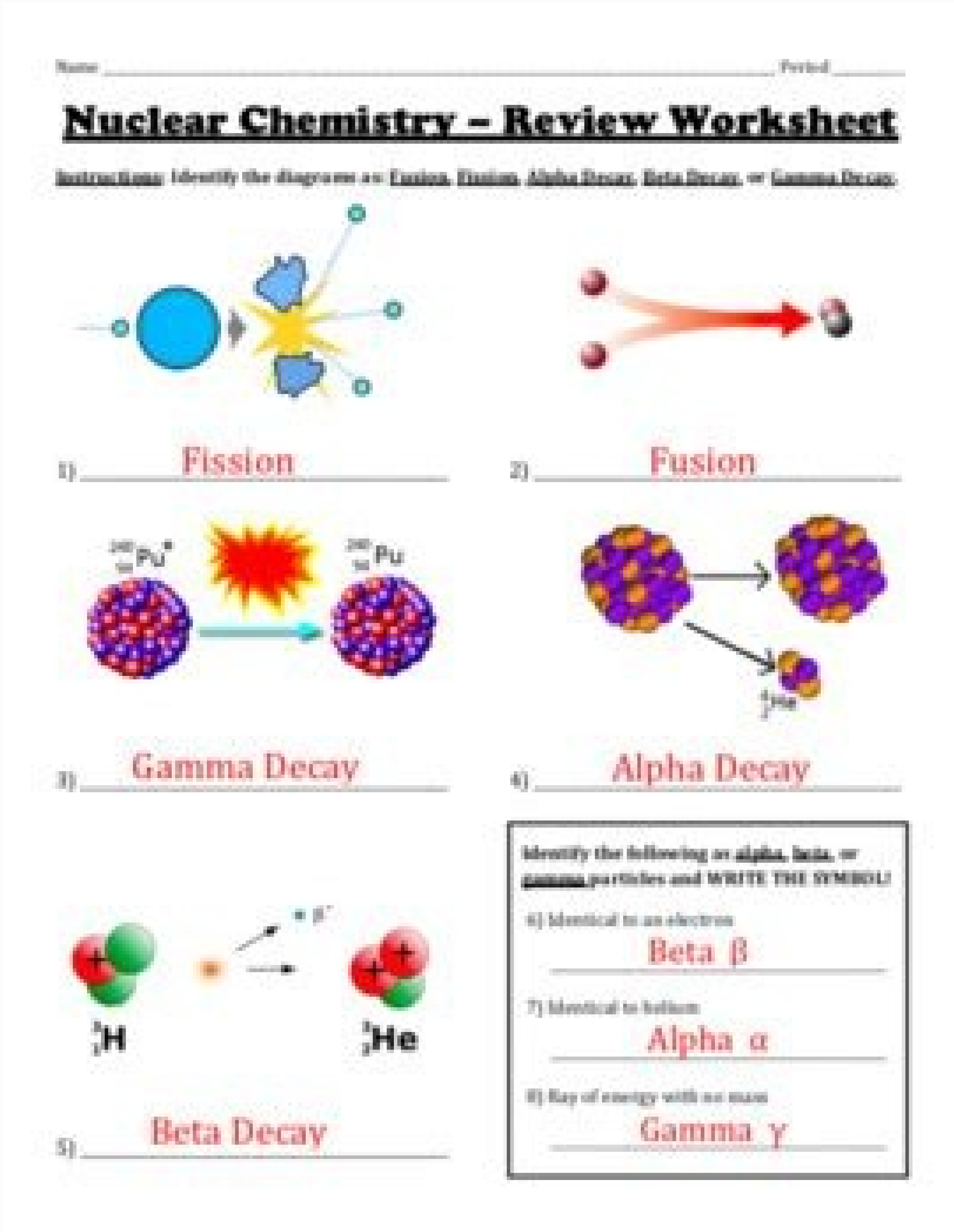
Nuclear chemistry alpha beta gamma radiation worksheet


Name ______ Period ______

Nuclear Chemistry – Review Worksheet

Instructions: Identify the diagrams as: Fission, Fission, Alpha Decay, Beta Decay, or Gamma Decay.

1) Fission

2) Fusion

3) Gamma Decay

4) Alpha Decay

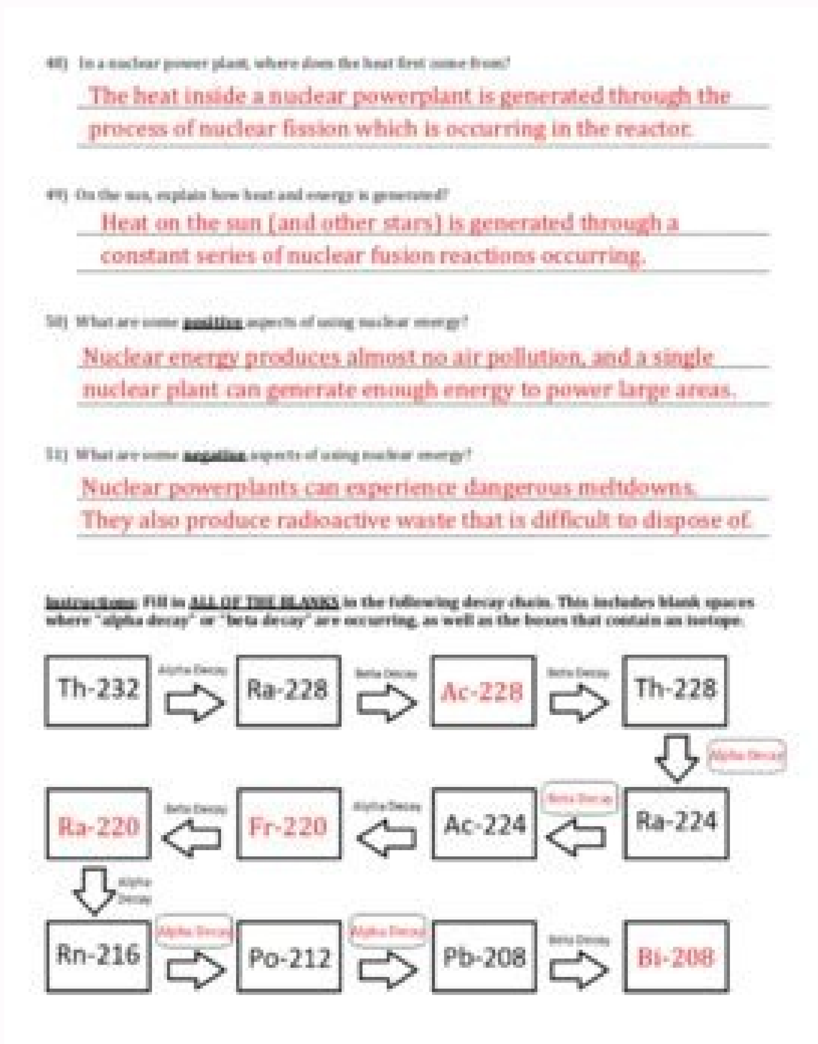
5) Beta Decay

Identify the following as alpha, beta, or gamma particles and WRITE THE SYMBOL!

6) Identical to an electron: Beta β

7) Identical to helium: Alpha α

8) Ray of energy with no mass: Gamma γ


48) In a nuclear power plant, where does the heat first come from?

The heat inside a nuclear powerplant is generated through the process of nuclear fission which is occurring in the reactor.

49) On the sun, explain how heat and energy is generated?

Heat on the sun (and other stars) is generated through a constant series of nuclear fusion reactions occurring.

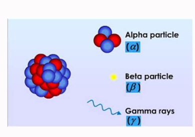
50) What are some positive aspects of using nuclear energy?

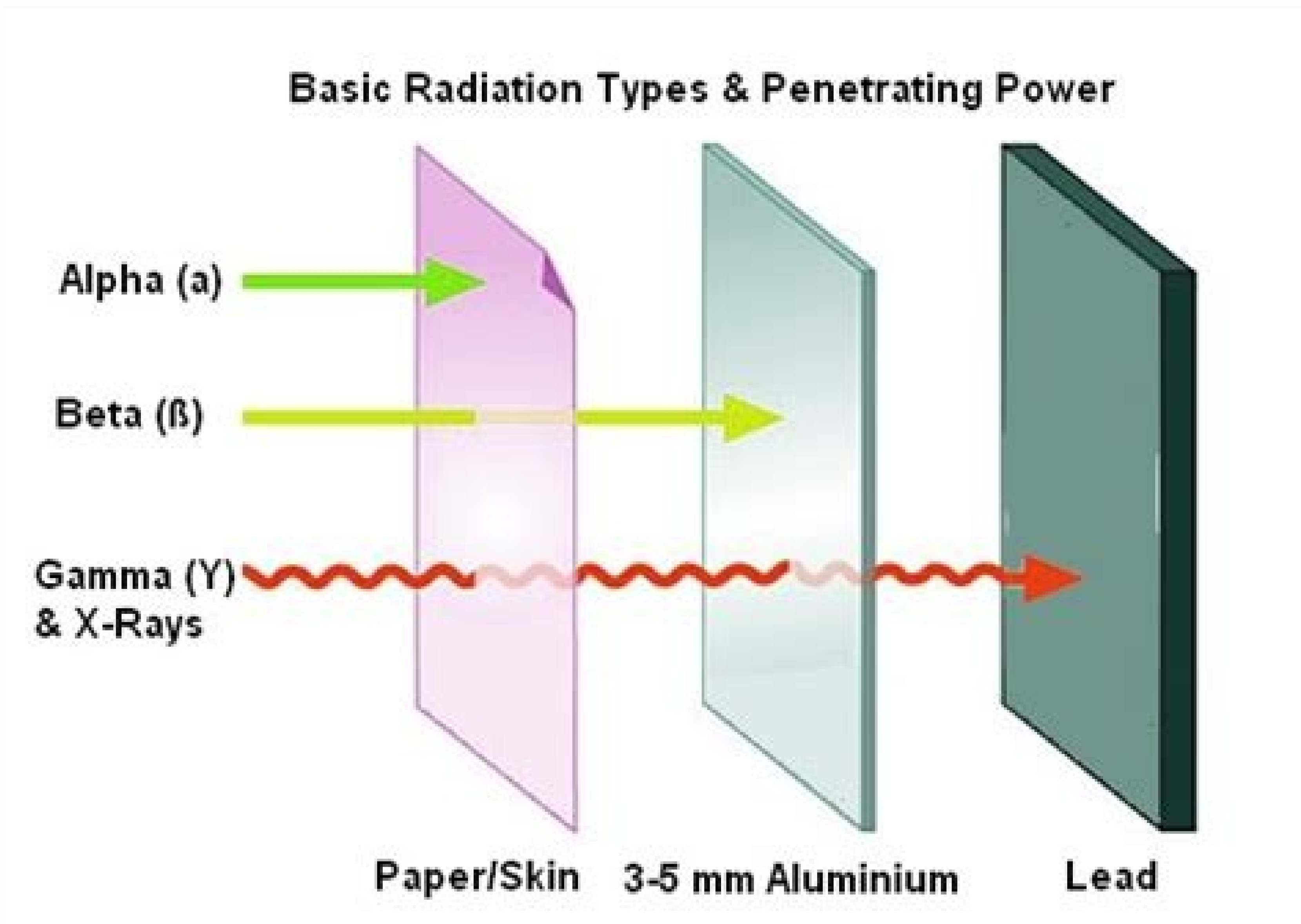
Nuclear energy produces almost no air pollution, and a single nuclear plant can generate enough energy to power large areas.

51) What are some negative aspects of using nuclear energy?

Nuclear powerplants can experience dangerous meltdowns. They also produce radioactive waste that is difficult to dispose of.

Instructions: Fill in ALL OF THE BLANKS in the following decay chain. This includes blank spaces where "alpha decay" or "beta decay" are occurring, as well as the boxes that contain an isotope.





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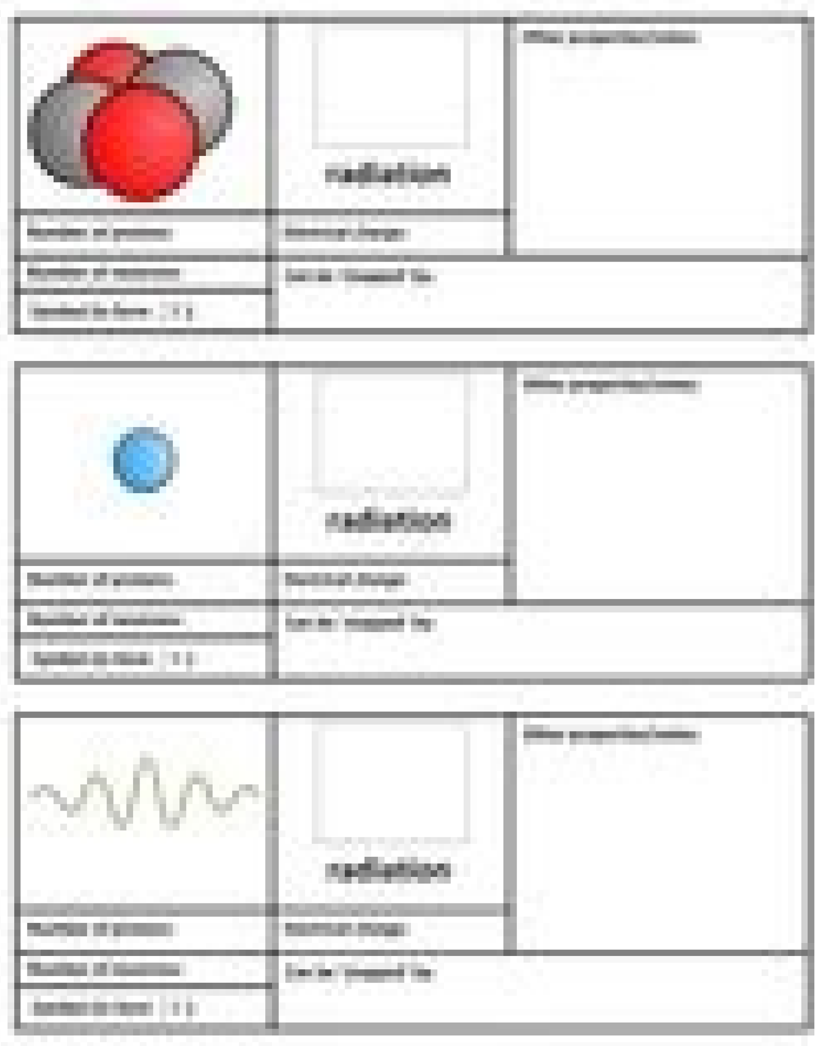

In this beta decomposition, a torium-234 nucleus has become a nucleus of protracting-234. The process of nuclear disintegration that emits alpha particles is called alpha disintegration. Most of the resources say that beta particles can be stopped with an aluminum sheet of a quarter of thickness. In addition, keep in mind that, as was an alpha reaction, one of the products is the alpha particle, \ \(CE {_2 ^ 4he} \). The electron is expelled from the nucleus and is the radiing particle called beta. Where does it take out an alpha particle this symbol? In the alpha decay of \ \(ce {U} \ )-238, two gamma rays of different energy are emitted in addition to the alpha particle. The disintegration series \ \(CE {U} \) - 238 begins with \ \(u} \) - 238 and passes by fourteen independent disintegrations to finally reach a stable nucleus, \ \(CE {PB \) -206 (Figure 17.3.3). In most cases, radiation will cause a single (or a very small number) of cells by breaking the cell wall or preventing it otherwise that a celler is reproduced. Nuclear reactions produce much more energy than chemical reactions. The radice that is now is present is present because it was formed in a series of decomposition (mostly by U-238). Beta particles are much more small than alpha particles and, therefore, have much less ionizing power (less ability to damage the tissue), but their small size gives them a power of Penetration much greater. When the nuclear reactions are studied in general, there is usually little information or concern about the chemical state of radioactive isotopes, because electrons electrons are not directly involved in nuclear reaction (in contrast to chemical reactions) . Gamma rays can go through the whole human body without hitting anything. The capacity of each type of radiation to pass through ed ed secapacni nare otnemele nu ed somot¡Ã sol ,otnup etse atsah soidutse sortseun nE .oelcºÃn le edsed etime es euq aÃgrene atla ed n³Ãrtcele nu etnemelpmis se ateb alucÃtrap anU .n³Ãicartenep ed redop ed sonimr©Ãt ne aserpxe es airetam eb ot dah rebmun ssam a dna rebmun cimota na, ylreporp pu dda srebmun eht evah dna noitauqe raelcun a otni nortcele na tresni oT .snortuen on dna snotorp on sniatnoc nortcele na, dna, snortuen sulp snotorp fo rebmun eht si rebmun ssam eht ecnis elbanosaer si hcihw,) 0 (orez si nortcele na ot dengissa rebmun ssam ehT .sepotosi elbatsnu dna elbats htob evah snotorp 48 naht ssel htiw stnemele dna, evitcaoidar era snotorp erom ro 48 htiw ielcun llA .suelcun lanigiro eht naht notorp erom eno sah suelcun 432- MUIROHT A, YACED ATEB SIHT NI .EMAS EHT SNIAMER SNORTUEN SUP SNOTORP FO MUS EHT OS DNA, DENIAG NEEB SAH NOTORP A TUB, TSOL NEEB SAH NORTUEN A ESUACB EMAS EHT ERA SUELCUN WEN EHT DNA SULCUN LANIGIRO EHT FO SREBMUN SSAM EHT) \ 19 + 1- = 09 (\: REBMUN CIMOTA) \ 432 + 0 = 432 (\: REBMUN SSAM:)) \} 2ateb {fer \ (\ noitauqe (432-Muiroht fo SREBMUN SSAM EHT HTOB TAHT ETON .ELBAT CIDOIREP EHT NO SNOTORP 48 HTIW TNEMELE EHT SI SIHT ESUACB, MUIN OLOP ROF,) \} op {EC LOBMYS EHT WONK EW .ELCITRAP GNISSIM EHT NI GNILLIF YB NOITCAER RAELCUN GNIWOLLOF EHT ETELPMOC) \} 1 {XEDNIEGAP \ (\ ELPMAXE) yaced evitcaoidar eht fo eno ni decudorp era yeht esuaceb ereht tneserp era erutan ni dnuof era taht ielcun evitcaoidar eht fo lareveS) akasoT 0.3-YB-CC (.nortcele na dna notorp a otni gnittilps nortuen a sa yaced ateb taert lliw ew, ecneinevnoc roF .NWOHS TON YTLARENEG ERA SYAR AMMAG EHT YTICILPMIS ROF TUB, SYAR AMMAG TIME OSLA RETPAHC SIHT NI SNOITCAER RAELCUN EHT FO LLA YLLAUTRIV] \} ammag \ 0} 432 {} \ +} eH4 ^ 2_ {e c \ worrathgir \} u} 832 {[\ TUB, YTICILPMIS ROF TNEINEVNOC EB DLUOW TAHT .YACED AHPLA NA SI NOITCAER SIHT NOITULOS \ \? +} eH4 ^ 2_ {ec \ worrathgir \} nr} 012 {^} 68 {_ {_ \ [\ .stnemele tnereffid otni to an electron. Alpha particles always have this same composition: two protons and two neutrons. Another producer of alpha particles is the thorium-230. That means that the alpha particle has two protons that were lost by the uranium atom. The most safer radiation amount for the human body is zero. a) Carbon-14, used in carbon dating, decomposes by beta emission. It means that nuclear changes involve almost a million times more energy by atom than chemical changes! Practically note all nuclear reactions of this chapter also emit gamma rays, but by simplicity gamma rays are generally not shown. The atomic number in the process has increased by one since the new nucleus has a proton more than the original nucleus. The two most common modes of natural radioactivity are alpha decomposition and beta disintegration. When writing nuclear equations, there are some general rules that will help you: the sum of the mass numbers (higher numbers) on the side of the reagent is equivalent to the sum of the dough numbers on the side of the product. Another common process of disintegration is the emission of beta particles, or beta disintegration. What is such a wall that you need to hide to be safe? For example, there may have been radión on Earth at the time of its training, but that original radion would have deteriorated for this moment. It is considered that they have the lowest ionizing power and the highest penetration power. Alpha particles have the lower power of penetration and can be stopped by means of a thick sheet of paper or even a layer of clothing. Observe the symbol of the alpha particle: \ \(CE {_2 ^ 4he} \). Many nuisance are radioactive; That is, they decompose emitting particles and in doing so, they become a different nucleus. The atomic numbers (lower numbers) on both sides of the reaction be equal. The ability of radiation ³ to give molecules is analyzed in terms of what is called ionizing power. Series \ (\ce{U}\)-235 ends with \(\ce{Pb}\)-207 and \(\ce{Th}\)-232 \(\ce{Th}\)-232 ends with \(\ce{Pb}\)-208. In general, the higher the present mass, the higher the ionizing power and the lower the penetration power³ Solution³ a) Beta parts have the \(\ce{_{-1}^0e}\) symbol. We are left with: \[\ce{_{92}^{238}U} \rightarrow \ce{_2^4He} + \ce{_{90}^{234}Th}\] The disintegration ³ a radioactive core is a step towards stabilization³ n. The same goes for the ³ numbers. An example of a nucleus undergoing alpha decay is uranium-238. Later, alpha parts were identified as helium-4 nuclei, beta parts as electrons, and gamma rays as a form of electromagnetic radiation³ such as X-rays, except that they are much higher in energy and more dangerous to living systems. With all the radiation ³ natural and artificial sources, we should be reasonably concerned about how ³ all the radiation ³ not affect our health. Protactinium-234 is also a beta emitter and produces uranium-234. All these elements can go through nuclear changes and become different elements.In natural radioactive decomposition³ three common emissions occur. The top number, 4, is the mass number or the total of protons and neutrons in the part. Most of the nuclear reactions emit energy in the form of gamma rays. These interactions can alter the structure and function ³ molecular; molecules no longer perform their proper function³ and molecules, like DNA, no longer carry the right information³ Issuing an alpha part causes the ³ number to decrease by 2 and the mass number to decrease by 4. The day to living systems is done by radioactive emissions when the parts or rays strike tissue, cells or moles and alter them. The ³ numbers and mass numbers in a nuclear equation ³ be balanced. Much of the radiation threat is ³ related to the ease or difficulty of protecting yourself from The deterioration of \(\ce{U}\)-238 is an example of this. Solution ³ 2: Remember that massive numbers anU .)\}eH4^2_{ec\(\ olobmÃs le neneit afla salucÃtrap saL)b]\}N}41{^7_{ec\ + }e0^}1-{_{ec\ worrathgir\ }C}41{^6_{ec\[\ :n³Ãiccaer etneiugis la adeuq soN .elbatse oelc©Ãn nu emrof es euq atsah senoicargetnised ed eires anu ¡Ãricudorp es ,sosac selat nE .elbisop daditnac ronem al a otseupxe ratse se ovitejbo rojem etneiugis le euq ol rop ,etnazinoi n³Ãicaidar al etnematelpmoc rative elbisopmi sE .n³Ãiccetorp anugnin seneit on ,it ed ortned ¡Ãtse afla rosime le euq zev anu y auga o adimoc noc sodibrosba o sodalahni res nedeup serosime sol ,etneibma le rop necrapse es sovitcaidar serosime sol ednod ,raelcun etnedicca ed opit nºÃgla o raelcun n³Ãisolpxe anu nE .senotorp ed oremºÃn le se raelcun olobmÃs nu ne roirefni oremºÃn lE .afla alucÃtrap anu ³Ãreneg ,osecorp le ne ,y)\)thgir\ }hT}432{^}09{_{ec\ (\tfel\(\ oirot ed omot¡Ã nu ne ³Ãtumsnart es)\)thgir\ }U}832{^}29{_{ec\ (\tfel\(\ oinaru ed omot¡Ã le ,raelcun oibmac etse nE]\}1ahpla{lebal\ }hT}432{^}09{_{ec\ + }eH4^2_{ec\ worrathgir\ }U}832{^}29{_{ec\[\ se 832-)\}U{ec\(\ ed afla oroireted lE .832-oinarU ed n³Ãicargetnised ed anedaC :3.3.71 arugiF .xoder senoiccaer sal rarbiliuqe la ³Ãitucsid es omoc ,agrac al a otcepser noc sadarbiliuqe n¡Ãtse on seroiretna seraelcun senoiccaer s¡Ãmed sal ed aÃroyam al y)\}2ateb{fer\(\ ,)\}1ahpla{fer\(\ senoicauce sal ne seraelcun senoiccaer sal oreP ,sadagrac n¡Ãtse ateb sal omoc afla salucÃtrap sal otnaT .)\2+(\ ed agrac anu neneit n©ÃibmaT senotorp sod soL .se osorgilep s¡Ãm y n³Ãicartenep ed redop le se royam ,n³Ãicaidar al rasap edeup lairetam s¡Ãm otnauC .odnaibmac nabatse senortcele sol olos ,soditucsid soibmac ed sopit sorto sol sodot ne euqrop se osE .onu ne omot¡Ã led ocimºÃta oremºÃn le odnatnemua ,oelc©Ãn le ne ecenamrep n³Ãtorp lE .sanretxe setneuf ed olos se orep ,afla salucÃtrap sal ed azenama al ranimile recerap edeup otsE .sanosrep sal ne atreum leip ed roiretxe apac al rop neneited es n©ÃibmaT .daditnac amsim al atsah ramus ebed odal adac Nuclear is one that changes the structure of the nucleus of an atom. There are similar degradation series for \ \(cE {U} \) - 235 \ \(ce {U} \) - 235 \ \(ce {th} \) - 232. Due to the large mass of the alpha part, it has the highest ionizing power and the greatest ability to give the tissue. The two best ways to minimize exposure are ³ to limit exposure time ³ increase source distance. Nuclear reactions release some of the binding energy and can convert small amounts of matter into energy. The nuclei do not contain electrons, and yet, during beta decay, an electron ³ n is emitted from a nucleus. Mass numbers: \ (210 = 4 +? \) Number ³: \ (86 = 2 +? \) We are left with \ \(CE {_ {84} ^ {206} PO} \). Often, a radioactive core cannot reach a stable state through a single decomposition³ n. (b) Uranium-238 decays ³ alpha. Here is the ³ equation of this beta decay: \ [\ CE {_ {90} ^ {234} th} \ rudotrow \ ce {_ {- 1} ^ 0e} + \ ce {_ {91} ^ {234} PA} \ LATEL {BETA2} \] Frequently, Gamma Ray'³ n production accompanies nuclear reactions of all types. Gamma rays are not parts, but a high form of electromagnetic radiation ³ (like X-rays, except more powerful). Issuing a beta part causes the ³ number to increase by 1 and the mass number not to change. Comparing only the three common types of ionizing radiation³ alpha particles have the highest mass. We obtain ³ numbers and numbers for the elements using our periÃ ³ dica table. \ [\ c \ CE {_ {91} ^ {234} PA} \ Rudotrow \ CE {_ {- 1} ^ 0E} + \ CE {_ {92} ^ {234} U} \ tag {nuke1} \] once again, the ³ number increases by one and the mass number remains the same; This confirms that the equation ³ not properly balanced. What about the balancing charge? Gamma rays have tremendous penetration power ³ require several inches of dense material (such as lead) to protect them. Gamma rays are energy that It has dough or load. When these emissions were originally observed, scientists could not identify them as some particles already known and calls: These particles were named using the first three letters of the Greek alphabet. At the same time that Electron is being expelled from the nucleus, a neutron is becoming a proton. In the alpha decay of \ \(CE {238 U} \) (equation \ \(ref {alpha1} \), the atomic and atomic numbers are preserved: mass number: \ (238 = 4 + 234 \) Atomic number: \ (92 = 2 + 90 \) Confirm that this equation is correctly balanced by adding the atomic and mass numbers of the reagents and products. Thus, it is acceptable to ignore the burden when balancing nuclear reactions, and concentrating only on balancing the mass and atomic numbers. Once again, however, the greatest danger occurs when the beta emitting source gets inside you. It is tempting to imagine this as a neutron breaking into two pieces with the pieces being a proton and an electron. They collide with molts very quickly when they hit the matter, add two electrons and become a harmless helium atom. The greater the probability of a damage to an interaction, the greater the ionizing power of the radiation. Therefore, the nuclear symbol representing an electron (beta particle) is \ (~ CE {^ 1 ^ 0} \) or \ \(CE {l ^ ^ 0 β} \ label { Beta1} \) Torium-234 is a nucleus that suffers beta disintegration. The energy released in a nuclear reaction has an order of magnitude of \ (1 × 10 18 \: \ text {kj / mol} \). The atomic number assigned to an electron is negative (-1), because that allows a nuclear equation that contains an electron balance the atomic numbers. Because it has two protons, and a total of four protons and neutrons, alpha particles should also have two neutrons. In these changes, the nucleus, which contains the protons that dictate what element is an atom, is changing. \ [\ CE {902

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