

Worksheet- Nuclear Decay

Instructions: Fill in the table below and then use it to figure out what is happening during each type of decay- - alpha (α), beta (β), and gamma (γ)

Parent Isotope	Particle emitted	New, Daughter isotope	Alpha, Beta, or gamma Decay?	# of protons lost or gained by "parent"	Change in mass number
a. ${}^{226}_{88}\text{Ra} \rightarrow {}^4_2\text{He} + {}^{222}_{86}\text{Rn}$			Alpha	Lost 2	minus 4
b. ${}^{214}_{84}\text{Po} \rightarrow {}^4_2\text{He} + {}^{210}_{82}\text{Pb}$			Alpha	Lost 2	Minus 4
c. ${}^{47}_{20}\text{Ca} \rightarrow {}^0_{-1}e + {}^{47}_{21}\text{Sc}$			Beta	Gained 1	None
d. ${}^{148}_{64}\text{Gd} \rightarrow {}^4_2\text{He} + {}^{144}_{62}\text{Sm}$			Alpha	Lost 2	Minus 4
e. ${}^{14}_6\text{C} \rightarrow {}^0_{-1}e + {}^{14}_7\text{N}$			Beta	Gained 1	None
f. ${}^{148}_{64}\text{Gd} \rightarrow {}^0_0\gamma + {}^{148}_{64}\text{Gd}$			Gamma	None	None

2. What changes take place in the nucleus when an alpha particle is emitted?

2 Protons and 2 Neutrons are lost.

3. What is the identity of an alpha particle?

Helium Nucleus

4. What changes take place in the nucleus when a beta particle is emitted?

Neutron is broken into electron and proton. Proton kept and electron released.

5. Which particle is associated with beta decay?

Electron

6. Fill in the missing parts of these nuclear reactions: (numbers & elements)

a) ${}^{40}_{19}\text{K} \rightarrow {}^0_{-1}e + {}^{40}_{20}\text{Ca}$	b) ${}^{230}_{90}\text{Th} \rightarrow {}^4_2\text{He} + {}^{226}_{88}\text{Ra}$	c) ${}^{35}_{14}\text{Si} \rightarrow {}^0_{-1}e + {}^{35}_{15}\text{P}$
d) ${}^{238}_{92}\text{U} \rightarrow {}^4_2\text{He} + {}^{234}_{90}\text{Th}$	e) ${}^{110}_{53}\text{I} \rightarrow {}^4_2\text{He} + {}^{106}_{51}\text{Sb} + {}^0_0\gamma$	f) ${}^{140}_{56}\text{Ba} \rightarrow {}^0_{-1}e + {}^{140}_{57}\text{La}$

7. Write equations for: a) The alpha (α) decay of radon- 198



b) The beta (β) decay of uranium-237



c) Plutonium- 244 undergoes gamma decay



9. Does the identity of an atom change during radioactive decay? Why or why not?

For alpha and beta decay it does because the proton number changes.

During gamma, there is no change of identity, just energy.

10. How does the "Law of Conservation of Matter" explain how you write nuclear equations?

The Law of Conservation of Matter states that matter cannot be created or destroyed. This is why the mass numbers and atomic numbers of the products must add up to equal the mass number and atomic number of the parent isotope.

11. List the 3 types of radiation (α, β, γ) in order from least penetrating to most penetrating.

Alpha= least

Beta= middle

Gamma= most

12. Why would you expect alpha particles to be less able to penetrate materials than beta?

The alpha particle is the largest of the three decay particles, so it will not be able to pass through materials as easily.

Nuclear Decay Worksheet Answers Chemistry

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Nuclear Decay Worksheet Answers Chemistry:

Chemistry Carson-Dellosa Publishing,2015-03-16 Chemistry for grades 9 to 12 is designed to aid in the review and practice of chemistry topics Chemistry covers topics such as metrics and measurements matter atomic structure bonds compounds chemical equations molarity and acids and bases The book includes realistic diagrams and engaging activities to support practice in all areas of chemistry The 100 Series science books span grades 5 to 12 The activities in each book reinforce essential science skill practice in the areas of life science physical science and earth science The books include engaging grade appropriate activities and clear thumbnail answer keys Each book has 128 pages and 100 pages or more of reproducible content to help students review and reinforce essential skills in individual science topics The series will be aligned to current science standards

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Science Spectrum Holt Rinehart & Winston,Holt, Rinehart and Winston Staff,2003-03

Prentice Hall Physical Science Concepts in Action Program Planner National Chemistry Physics Earth Science ,2003-11 Prentice Hall Physical Science Concepts in Action helps students make the important connection between the science they read and what they experience every day Relevant content lively explorations and a wealth of hands on activities take students understanding of science beyond the page and into the world around them Now includes even more technology tools and activities to support differentiated instruction

Holt Chemistry Holt Rinehart & Winston,2003-01-24

Carolina Science and Math Carolina Biological Supply Company,2003

Merrill Chemistry Robert C. Smoot,Smoot,Richard G. Smith,Jack Price,1998

Modern Science and the Book of Genesis James William Skehan,National Science Teachers

Association,1986 Based on the premise that knowledge of evolutionary theory is essential for understanding the natural world this document was designed to assist science teachers and others as they consider the issues that influence the teaching of evolution The position is taken that there is no conflict between data and sound theories based on science and religious beliefs based on the Bible Information and perspectives are presented under the topic headings of 1 The Genesis of Genesis 2 Early Science Interprets Genesis 3 New Data 4 Creationism versus Science and 5 Two Kinds of Knowledge References are listed and the National Science Teacher Association s position statement on the Inclusion of Nonscience Tenets in Science Instruction is included ML **NBS Technical Note** ,1966-06 A Peak AC-DC Voltage Comparator for Use in a Standards Laboratory L. A. Marzetta,1966 Analytical Mass Spectrometry Section: Instrumentation and Procedures for Isotopic Analysis William R. Shields,1966 Study Guide, Student Edition Merrill,1994-07 **Status Report: National Standard Reference Data System, April 1966** Edward L. Brady,1966 **Current Index to Journals in Education** ,1989 The British National Bibliography Arthur James Wells,1968 *Books in Print Supplement* ,2002
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