

7.2 PhET LAB: Alpha Decay



Name: _____

OBJECTIVE: explain the alpha decay process; complete radioactive decay equations; define and analyze half-life through applying the PhET "Alpha Decay" simulation at <http://phet.colorado.edu>.

Open/Run Alpha Decay at <http://phet.colorado.edu>.

Take 5 minutes to freely explore the sim.

Investigating Alpha Decay

1. Start on the **SINGLE ATOM** tab. Observe the decay of Polonium-211. After each decay, press the **RESET NUCLEUS** button to watch the process again. Write a description of alpha decay for Po-211.

Complete the following alpha decay equations, using <http://www.chemicalelements.com> as a resource:



7. How is alpha decay used in everyday life? (give at least two uses)

Investigating Half-Life of Alpha Decay

8. Click the **MULTIPLE ATOMS** tab. Execute five trials to determine the number of parent and daughter nuclei at one half-life. Complete the table below.

Parent Nuclei Po-211	Parent Nuclei (remaining nuclei) [yellow]	Daughter Nuclei (decayed nuclei) [black]
100		
80		
60		
40		
20		

9. Define half-life.

Alpha Decay Phet Simulation Answers

A. Săndulescu, M. Rizea, I. Târnoveanu

Alpha Decay Phet Simulation Answers:

Emerging Technologies for STEAM Education Xun Ge, Dirk Ifenthaler, J. Michael Spector, 2015-09-09 This theory to practice guide offers leading edge ideas for wide scale curriculum reform in sciences technology engineering the arts and mathematics the STEAM subjects Chapters emphasize the critical importance of current and emerging digital technologies in bringing STEM education up to speed and implementing changes to curricula at the classroom level Of particular interest are the diverse ways of integrating the liberal arts into STEM course content in mutually reshaping humanities education and scientific education This framework and its many instructive examples are geared to ensure that both educators and students can become innovative thinkers and effective problem solvers in a knowledge based society Included in the coverage Reconceptualizing a college science learning experience in the new digital era Using mobile devices to support formal informal and semi formal learning Change of attitudes self concept and team dynamics in engineering education The language arts as foundational for science technology engineering art and mathematics Can K 12 math teachers train students to make valid logical reasoning Moving forward with STEAM education research Emerging Technologies for STEAM Education equips educators education researchers administrators and education policymakers with curricular and pedagogical strategies for making STEAM education the bedrock of accessible relevant learning in keeping with today's digital advances

Internal Assessment for Chemistry for the IB Diploma Christopher Talbot, 2018-08-27 Exam board International Baccalaureate Level IB Diploma Subject Chemistry First teaching September 2014 First exams Summer 2016 Aim for the best Internal Assessment grade with this year round companion full of advice and guidance from an experienced IB Diploma Chemistry teacher Build your skills for the Individual Investigation with prescribed practicals supported by detailed examiner advice expert tips and common mistakes to avoid Improve your confidence by analysing and practicing the practical skills required with comprehension checks throughout Prepare for the Internal Assessment report through exemplars worked answers and commentary Navigate the IB requirements with clear concise explanations including advice on assessment objectives and rules on academic honesty Develop fully rounded and responsible learning with explicit reference to the IB learner profile and ATLs

Theory of Alpha Decay W. Tobocman, 1962 **Alpha Decay Widths and the Structure of the Alpha Particle** A. Săndulescu, M. Rizea, I. Târnoveanu, 1977 **Contributions to the Theory of Alpha Decay** Per Olof Fröman, 1957 Alpha Decay as a Fission-like Process D. N. Poenaru, M. Ivascu, A. Sandulescu, 1979

Alpha Decay from Deformed Nuclei Tore Berggren, Peter Olanders, 1987 Theory of Alpha-decay Joseph J. Devaney, 1953 *Alpha Decay as a Weak Interaction* A. O. Barut, A. Sevgen, 1973 **On the Theory of Alpha Decay** Pieter Johannes Brussaard, 1958 **Alpha Decay in Isotopes of Atomic Number Less Than 83**, 1949 Some time ago we started work in an attempt to observe alpha particle decay in isotopes of atomic number less than 83 In the first experiments thin targets of gold leaf were bombarded with 190 Mev deuterons in the 184 inch cyclotron Two alpha decay periods were

observed in these targets one of 0.7 minutes half life and another of 4.3 minutes half life. The alpha particle energies were 5.7 and 5.2 Mev respectively. Chemical separations proved that the 4.3 minute period is due to a gold isotope and suggested that the 0.7 minute period is due to a mercury isotope. The mass numbers of these new isotopes have not been determined. However the results of excitation functions in the production of the gold isotope by bombarding gold and platinum with protons suggest that its mass number lies in the range 185-188. The work on this isotope indicates that the alpha to electron capture branching ratio is of the order of magnitude of 10:4 and that positron activity accompanies the 4.3 minute alpha period.

On the First Structure in Alpha Decay Niels Bohr, P.O. Fröman, Ben R. Mottelson, 1955

Alpha-Decay Paradox, Barrier Penetration Shivam Gress, 2024-11-15

In earlier times the challenge of alpha particle barrier penetration was a notable concern in the domain of classical mechanics. The application of quantum mechanics to this problem not only aids in its comprehension but also provides insights into various questions including the variation of alpha energy with half life which is a key aspect of the Geiger Nuttall rule and can be explained through quantum mechanics. Alpha decay exemplifies a practical issue that directly relates to the theoretical concepts of potential wells and barriers introduced in the foundational stages of quantum mechanics education. A comprehensive grasp of this theory is essential for tackling more intricate problems within the discipline. This text provides an in depth exploration of the alpha decay issue emphasizing the limitations of classical methods in examining the relationship between decay energy and half life while also demonstrating how quantum mechanics effectively addresses these challenges. Furthermore the book offers a detailed analysis of the energetics involved in alpha decay thereby enhancing students comprehension of the subject. A solid understanding of alpha decay energetics lays the groundwork for a more straightforward grasp of beta decay energetics. The focus of this book is exclusively on transitions from ground state to ground state for even even nuclei even atomic number and even neutron number. Calculations related to odd odd even odd and odd even nuclei are not included as they fall outside the intended scope of this work. However future editions may consider incorporating this topic as an additional feature.

Alpha Decay and Excited States of ^{111}Xe Luigi Capponi, 2014

Alpha Decay from Deformed Nuclei Tore Berggren, Peter Olanders, 1987

Alpha Decay Amplitudes and Their Phases Lester Wayne Miller, 1959

On the Fine Structure in Alpha Decay Niels Bohr, Per Olof Fröman, Ben R. Mottelson, 1955

Alpha Decay Joseph J. Devaney, 1950

Systematics of Alpha Decay Half-life, 2006

Alpha Decay of Deformed Nuclei Tina Louise Stewart, 1996

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