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RE-EVALUATING THE MEASUREMENTS OF RADIOACTIVE DECAY

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ABSTRACT

Studies investigating the validity of radiometric dating methods have raised many questions with results of methods showing ages of samples well outside the mainstream story line and a prospect of accelerated decay rates during the Flood. However, the measurements of the rates themselves have not been analyzed. This study examines a mathematical analysis of how the half-life of isotopes U-238, K-40, Rb-87, and C-14 have been measured and calls for a closer inspection of the process. The primary tool for measuring the half-life is the Geiger Counter, which only has a 20% efficiency rate, [1] while observation times of individual samples run at a calculated percent of between 1.75 E-(-4) and 4.045 E-(-16) of the proclaimed measurements. This raises the question of how thorough the initial studies of the measurements of decay rates were and brings up several experiments that can be done which could either validate the measuring tools or utterly refute them.

If the decay constants are measured accurately, then a known amount of a given substance should physically decay in a measurable time. A sample with 5g of C-14 can be placed in a nitrogen-free environment and within three days, there should be reduction of 0.005 mg (1 part per million) of the sample. As individual samples are not examined long enough to determine consistency for decay rates, experiments using the same sample over long periods of time should reflect the exponential decay pattern.

With such short observation times, it also raises the question if the counts as a whole were ever plotted on a graph to be curve fit. If the counters are accurate, then the counts should be in the range of E-7 to E-14 for U-238 and C1-4 respectively for just 30 minutes of counting of the decay of a 5g sample. These counts should plot on a graph that reflects an exponential decay curve, yet with the such short observation times of individual samples, the data points would be on top of each other and impossible to determine the type of curve.

If the experiments proposed are carried out and showcase significant discrepancies, then the entire system of dating methods would need to be entirely redone or completely discarded. This is the introductory part of a study that would also include evaluating the effective ranges of the methods based on ability to count isotopes and the mathematical analysis of the error +/- factors to determine if the errors are really due to a consistent set of variables or something else. Further study would be to examine the accelerated decay proposal from R.A.T.E and an analysis on how aqueous leaching would affect measurements for the methods.

[1]: Postma, James. Chemistry In the Laboratory. W.H. Freeman Publishing. 2016

KEYWORDS

Radiometric dating, half-life, radioisotope dating, age of the earth, mathematical analysis

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Re-Evaluating the Measurements of Radioactive Dating Methods
9th International Conference on Creationism

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Abstract

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Table 1: Percent of Observation of Proclaimed Half-Life Measurements

Decay Method	Measured Decay Rate	Ten Minutes Observation	One Month Observation	One Year Observation
U-238 to Pb-206	4.5 Billion Years	4.25 E-(-15)	1.852 E-(-11)	2.222 E-(-10)
K-40 to Ar-40	1.3 Billion Years	1.46 E-(-14)	6.41 E-(-11)	7.692 E-(-10)
Rb-87 to Sr-87	47 Billion Years	4.045 E-(-16)	1.77 E-(-12)	2.128 E-(-11)
C-14 to N-14	5730 Years	3.32 E-(-9)	1.45 E-(-5)	1.75 E-(-4)

Conclusion

While previous studies have been incredible in showcasing the fundamental flaws of the radiometric dating methods, they have not yet finished the job. This study should help put the final nails into the coffin while also help us explore further the effects of the Flood upon the laying down of the layers and aftermath. It just needs access to the equipment to be able to run the tests for both short term and long term analyses.

Experiment 1: Validate Half-life Measurements with Measuring Physical Decay

By using the proclaimed half-life, we can calculate a ratio of parent to daughter isotope at the time it should take to decay by that amount physically. If Carbon-14 has a half-life of 5730 years, then a given sample of C-14 should decay physically by an amount of 1 part per million in a span of three days. If U-238 has a half-life of 4.5 billion years, then there should be a certain amount of lead produced after a year or two have passed. This could be done with an Atomic Mass Spectrometer. Table 2 gives predictions of what values such experiments should produce if the half-life measurement is accurate.

Data Table 2: Predictions of how much physical decay should be observed by x time.

Time/Mass Ratios	U-238	K-40	Rb-87	C-14
Half-Life In Years	4.6 billion	1.3 billion	47 billion	5730
Time to Measure Decay of 100 Parts per Billion	649.2 years	187.5 years	6781 years	8.267 E-(-4) years or 7.24 hrs
Time to Measure Decay of 1 Part per Million	6492 years	1875 years	67807 years	8.267 E-(-3) years or 3.02 days
Time to Measure Decay of 500 Parts per Million	3.25 E-6 years	9.38 E-5 years	3.39 E-7 years	4.13 years
Time to Measure Decay of 1%	6.52 E-7 years	1.88 E-7 years	6.81 E-8 years	83.1 years
Amount of Parent Isotope Left After 3 Days	Too small to measure	Too small to measure	Too small to measure	0.999999
Amount of Parent Isotope Left After 1 Month	Too small to measure	Too small to measure	Too small to measure	0.9999899
Amount of Parent Isotope Left After 6 Months	Too small to measure	Too small to measure	Too small to measure	0.9999395
Amount of Parent Isotope Left After 1 Year	Too small to measure	0.99999999	Too small to measure	0.999879
Amount of Parent Isotope Left After 5 Years	0.99999999	0.99999997	Too small to measure	0.9993953
Amount of Parent Isotope Left After 10 Years	0.99999998	0.99999995	Too small to measure	0.9987911

Resources for Further Study

Thousands Not Billions: Don DeYoung
Rethinking Radiometric Dating: Vernon Cupps
The Mythology of Modern Dating Methods: John Woodmorappe
Creation-Evolution Literature Database: Andrew Snelling papers on radioactive decay

Experiment 2: Validate the Counters How Many Decay Counts Should There Be?

Does radioactive decay actually follow an exponential decay curve? Most defenders of such methods refer to statistics, yet what is usually seen is the mathematical derivations of the equation and not seeing the actual plotting of data of decaying counts onto a graph. With the extremely short observation times noted, can one make an accurate claim as to what kind of decay function should actually be used? Also, are the measuring tools and devices able to handle the number of decay counts that should be expected? And can the discrepancies be accounted for by a consistent error factor?

Data table 3: Number of decays that should be counted from a 5-gram samples per time period.

Decay Count Criteria	U-238	K-40	Rb-87	C-14
Half-Life In Years	4.5 billion	1.3 billion	47 billion	5730
# Atoms in a 5 gram sample	1.26 E-21	7.53 E-21	3.46 E-21	2.15 E-22
# Atoms Decayed in 1 Minute	Incalculable	Incalculable	Incalculable	4.95 E-12
# Atoms Decayed in 30 Minutes	1.1 E-7	2.285 E-8	Incalculable	1.485 E-14
# Atoms Decayed in 8 Hours	1.78 E-8	3.66 E-9	4.67 E-7	2.38 E-15
# Atoms Decayed in 1 Day	5.33 E-8	1.10 E-10	1.40 E-8	7.12 E-15
#Atoms Decayed in 1 Month	1.60 E-10	3.299 E-11	4.20 E-9	2.17 E-17
# Atoms Decayed in 1 Year	1.95 E-11	4.01 E-12	5.10 E-10	2.60 E-18
# Atoms Decayed in 10 Years	1.95 E-12	4.01 E-13	5.10 E-11	2.60 E-19

Discussion: What Does This Data Mean?

This is a preliminary investigation into a much more thorough study on the dating methods. If the current measurements of the decay of radioactive isotopes are not accurate, then the entire system would have to be re-calibrated to more accurate measurements. These calculations should ignite additional study in the following subtopics:

1) Getting an accurate use of the date ranges in which these methods can be used to accurately reflect the amounts of isotopes we can measure;
2) Comparing the +/- error factors of numerous samples and calculating the true error factors down a single set that are reliable and constant as opposed to being randomly all over the place;
3) Further investigate the effects of natural phenomenon that isotopes would experience on occasion and are not present when put into a counter such as: geologic pressures, the effects of earthquakes, lightning strikes and E/M pulses that would traverse through the earth to identify what could cause decay rates to accelerate. Further study on the timing of the counting needs to be done to test the effects of our physical proximity to the sun and other solar-related events;
4) This study would also lead to thoroughly investigating the combination of accelerated decay along with the high/low tides during the Flood to create some models to showcase the effects of aqueous leaching that would take place during the rising and falling tides as the Flood waters rose and then receded.