Interstellar Sample Analysis : A Failed Project Orion Type Interstellar Probe Sent To Investigate Earth?

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Abstract

An object came into atmosphere and exploded in 2014 at approximately 45km /sec, indicating a free fall from interstellar space, with incandescent debris falling into ocean north off of Papua New Guinea. Track indicates disassembly into shower of molten droplets occurred deep in atmosphere despite high speed of entry and shows object had very high mechanical strength and heat resistance. Iron rich spherules were collected magnetically off of the ocean bottom. The near absence of nickel in the spherules argues against the possibility that this object was a product of natural processes. Fe isotopes are extrasolar, and the spherules also show enhanced relative abundance pattern of certain elements over standard Solar/ CI relative abundances with exceptionally high relative abundances of Be, Li, U and La. Abundances of Al and Ti plus Fe are also elevated also over normal relative Solar/ CI abundances and are approximately consistent with thermally processed Ti Al Fe alloys known to have high strength. Abundances of Be Li U are consistent with thermally processed Thermonuclear device components. Because of its free fall trajectory it is conjectured that this was Project Orion type interstellar probe sent to investigate Earth whose nuclear braking charges failed to deploy, preventing it from assuming a stable terrestrial orbit. Alternatively, those charges were disabled to avoid alarming near-Earth thermonuclear explosions and to allow the probe to burn up harmlessly in the atmosphere.

Introduction

An object came into atmosphere and exploded in 2014 at approximately 45km /sec, indicating a free fall from interstellar space, with incandescent debris falling into ocean north off of Papua New Guinea. Track analysis indicates disassembly into shower of molten droplets occurred deep in the atmosphere despite high speed of entry and shows the object had very high mechanical strength and heat resistance.[1] Iron rich spherules were collected magnetically off of ocean bottom, Fe isotopes of these spherules confirms that are the remnants of an extrasolar ,object [2] and are the result of aerodynamic disassembly of molten of high speed body. They are composed of surviving elemental components of a molten mixture exposed to an oxygen rich atmosphere, so pre-molten disassembly relative abundances of elements can only be approximately estimated from the spherule content. Interpretation of analysis must be caveated by recognition of probable Fe enrichment of collected previously molten droplets. Magnetic collection biases collection towards iron rich debris from disassembly, and the greater flammability of U Li Al and Ti relative to Fe and Be, as measured by their relative electronegativities, provides further possible bias towards enhanced Fe and Be.

Beryllium is commonly used as the reflector material (or 'pit liner') in most contemporary American nuclear weapon thermonuclear primaries. [3] The 'primary', or thermonuclear weapon trigger, consists of three components: the central spherical plutonium 'pit' or core, the Be 'pit liner', and a surrounding high-explosives shaped-charge. The pit liner, sometimes also referred to as the "skull", surrounds the spherical plutonium pit and is in turn surrounded by a natural uranium tamper and high explosives. (see Figure 1)

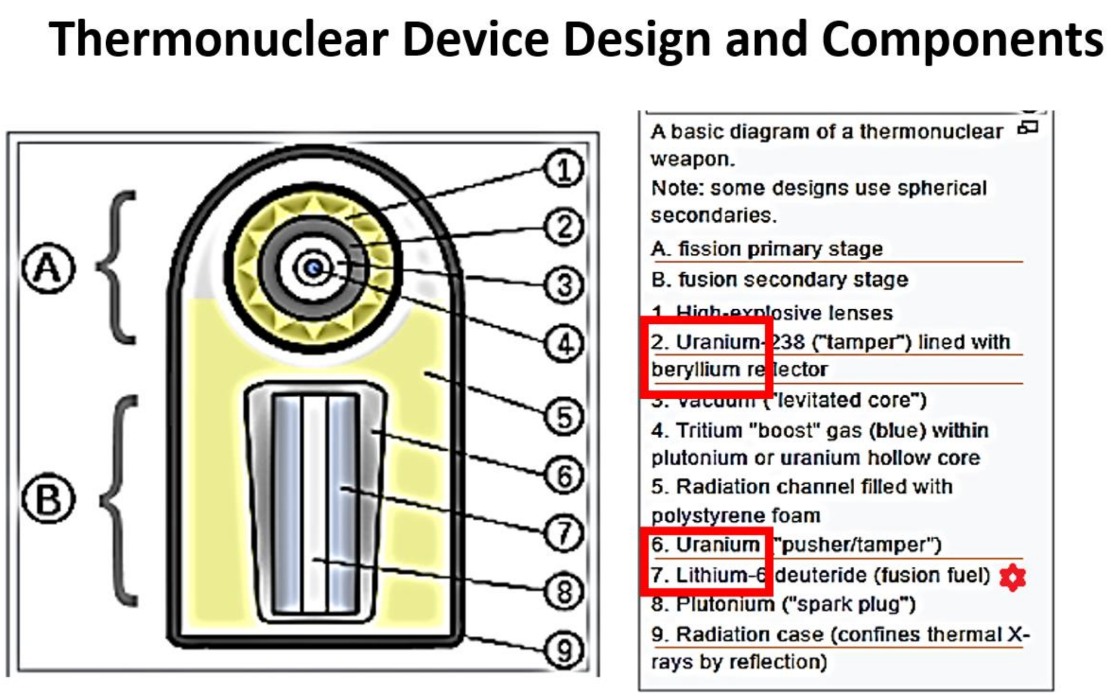

Figure 1. A Diagram of a Thermonuclear Device showing berylium, lithium and uranium components. Asterisk indicates that modern devices use natural lithium. A natural mixture of 95% Li7 and only 5% Li6 nuclear isotopes as was first demonstrated in the Castle Romeo Test [4]. Figure adapted from Wikipedia Commons.

Therefore, deployed nuclear weapons contain large amounts of natural Beryllium, Lithium and Uranium and can also contain Thorium (US W71 warhead). Such a pattern of elements would then be expected to be employed in thermonuclear charges to propel an Orion Project type interstellar probe [5].

Spherule Composition Verus Solar/CI Relative Abundances of Elements

The laws of nuclear Physics are universal in the cosmos and govern the life and death of stars. These laws also determine the pattern of abundances of the elements and their isotopes formed in stars that explode. This pattern of elements is then recycled to make new stars and the systems of planets and planetoids around them. While subtle differences in isotopes produced by different stars can be seen in their spectra, the basic pattern of abundances of stable elements in our Solar system appears to be fairly typical of the universe, again based on stellar spectra.

The Sun and asteroids, which are the source of common meteorites, have almost identical composition for solid elements. Of the meteorites recovered, the approximately “chondritic” pattern of relative abundance of elements is seen. A notable exception to this pattern of relative abundance is the comparatively rare Nickel-Iron group of meteorites, or “siderites” where iron mixed with nickel makes up most of the composition. Nickel is present in concentrations of higher than 4% by weight and can be as high as 25% [6] in that rare group of meteorites. CI carbonaceous Chondrites, on the other hand, appear to have the best match to the pattern of relative abundances of elements in the Sun of the more abundant chondrites, so they are used as the standard for Solar composition and by extension, cosmic composition. Thus, the pattern of relative abundances in the CI are considered a standard "metric" for measuring the composition of anything extraterrestrial that falls out of space [7]. A graph of relative abundances, relative to 10^6 Si atoms in CI s and reflecting Solar and by extension, approximate cosmic relative abundances, is shown in Figure 2.

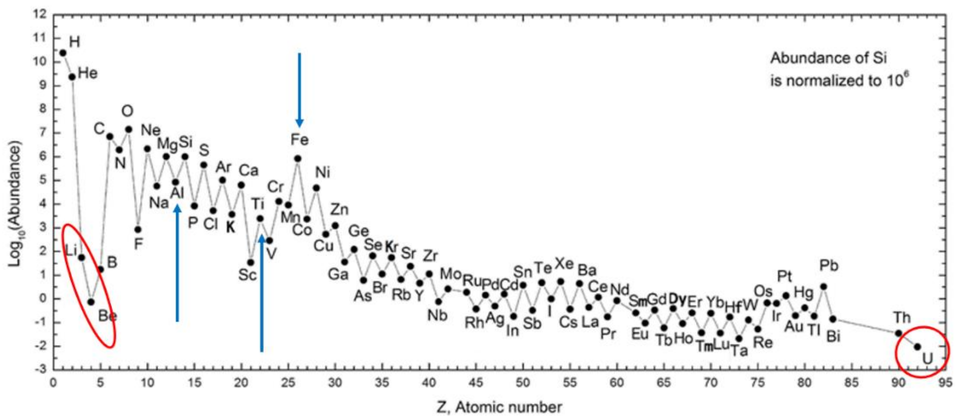

Figure 2. Graph of Log 10 relative abundance versus Si in CI carbonaceous Chrodrites whose relative elemental abundances have been found to match those in the found in the Sun. Note the close values for abundance of Nickel and Iron.

Therefore, Solar/CI indicates that shared pattern of relative elemental abundances [7]. Be Li and U can be seen as being very rare elements. Fe is fairly common in the universe, as are Al and Ti.

Plotting the ratio of abundances of elements relative to Si in a sample from outer space and then, in turn, its ratio to the ratio of relative abundance found in CI is a measure of the "strangeness" of a sample versus the natural comic background composition as represented by the Sun. We will represent this "strangeness" measure by EQ/CI , where EQ means relative abundance of element Q to Si in a sample, and CI represents the relative abundance of element Q to Si in the CI. That is, if E1 is the abundance of element 1 relative to Si in CI meteorite: $E1_{CI}$, and $E1_{Sample}$ is the corresponding ratio for some other material sample then we can write

$$E1/_{CI} = \frac{E1_{Sample}}{E1_{CI}} = \frac{\left(\frac{E1}{1e6Si}\right)_{Sample}}{\left(\frac{E1}{1e6Si}\right)_{CI}} \qquad (1)$$

If this "strangeness" ratio of ratios is much different than 1, indicating a substantial deviation from the Solar/CI pattern of relative abundances, it could indicate a sample is substantially melt processed and differentiated after initial condensation from a gaseous nebula, such as becoming part of the molten core of a planetoid. Examples of such processed materials are Nickel-Iron meteorites or even a technologically produced material rather than a product of nature. The ratios of elemental abundances , relative to the CI metric in one of the representative "exotic" recovered spherules is shown in Figure 3.

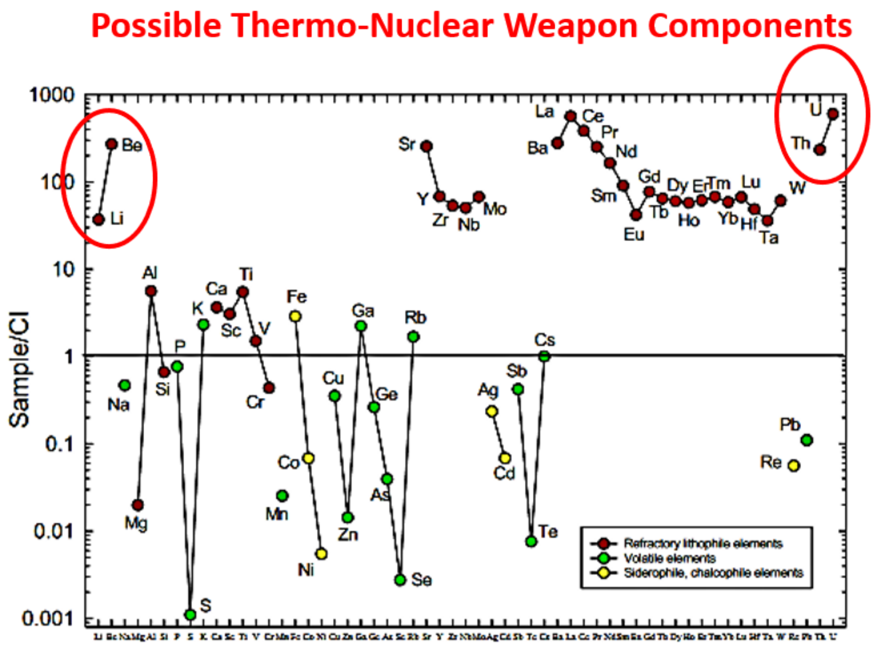

Figure 3. The "BeLaU" elemental abundances of Spherule 21(Normalized to CI Chondrites) versus atomic number for 56 elements. The Solar System standard of CI chondrites is represented by a value of unity on the plot. Elements seen to be associated in Thermonuclear devices are circled in red.

Technological signatures are often determined the ratios of abundances of pairs of elements in a sample of material, indicating metal alloys or even, in the case of melt processed samples, ensemble compositions.

In order to find the actual ratio of elemental atomic abundances for pairs of elements found in an extraterrestrial sample, relative to each other, one can use the 'ratio of ratios'of the elements found in the sample relative to CI abundance (or Solar since the two patterns are essentially identical) for each element and then multiply this by the Solar/CI ratio. Thus, if two elements in a sample have an 2:1 ratio of the first element to the second, in terms of 'ratio of ratios' to that found in CI , but the first element is actually 10 times more abundant than the second in absolute terms, based on the Solar/CI relative abundance standard , then one would find that the actual ratio of first element abundance to the second is 20:1 in the sample. Thus, the equation for the actual ratio of abundances of two elements E1 and E2 in a sample, E1/E2, can be written in terms of their abundance ratios to Si ratioed, in turn, to those ratios found in in CI : E1/CI , E2/CI, that is their "strangeness", and then also using the standard ratio of relative abundance in CIs: $(E1_{CI})/(E2_{CI})$.

Such an actual ratio of the abundances of the two elements in the sample could be then written as the following.

$$E1/_{E2} = \frac{E1/CI}{E2/CI} * \frac{E1_{CI}}{E2_{CI}} \qquad (2)$$

We will now apply this analysis to the Spherules recovered off New Guinea.

Spherule 21 has ~10 times more of the ratio of Be/CI than ratioed Li/CI. Solar/CI composition normally shows 100 x Li than Be. Therefore, by Eq. 2 the actual ratio , atom to atom, of abundances of Li to Be in Spherule 21 is ~ 10:1. Spherule 21 has ~3 times more U/CI than Be/CI. Solar/CI is normally ~100x Be than U in ratio of abundances. Therefore the actual ratio of abundance of Be to U in Spherule is ~ 30:1 (by mass , since U238 is 26.4 times as massive as Be9 , its only stable isotope, the weight ratio of U to Be in the sample ~ 1:1). Spherule 21~4 times more U/CI than Th/CI, whereas the Solar/CI abundances indicate ~3x Th more than U in abundance. Therefore, the actual ratio of abundance of U to Th in Spherules is ~ 1:1. Accordingly, the ratios of abundances of Be , Li U and Th in spherule 21 and similar spherules are consist with a fragment of a melted and partially oxidized thermonuclear device. A similar analysis can be performed on another group of elements anomalously abundant in spherule 21.

Based on the CI relative abundance metric, spherule 21 also contains enhanced levels of titanium and aluminum as well as iron. However, nickel is anomalously sparse in the composition, suggesting this is not a fragment of former planetary molten core, but rather resembles the composition of a melt processed and partially burned sample of a high strength aerospace alloy.[8] This is seen clearly in Figure 4.

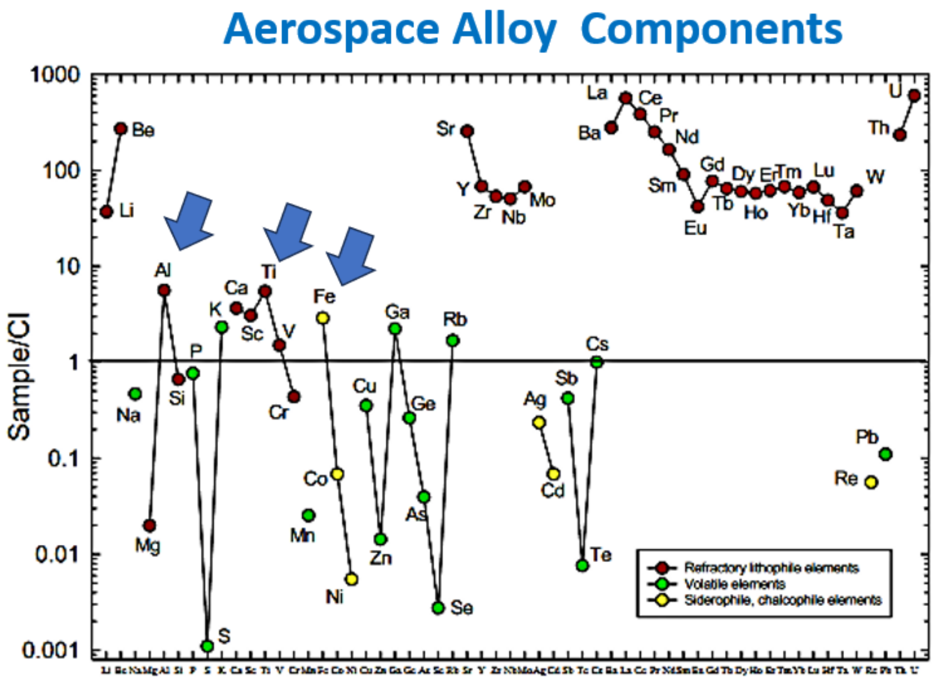

Figure 4. The Ti Al Fe elemental abundances of Spherule 21(Normalized to CI Chondrites) versus atomic number for 56 elements. The Solar System standard of CI chondrites is represented by a value of unity on the plot. Elements often associated with high strength aerospace alloys are indicated by blue arrows. Nickel, which like iron is an end product of nucleosynthesis in the majority of stars, is of very low abundance in this sample relative to iron, indicating this sample is not derived from a planetary molten core.

Spherule 21 has, relative to CI abundance Fe/CI, ~ 30xCI as can be seen in the graph, and the corresponding ratio for aluminum is Al/CI ~70xCI and for titanium, a high temperature resistant and high strength to weight ratio, aerospace metal, we have the abundance ratio, relarive to that in CI, from Figure 4: Ti /CI ~ 70xCI. Solar/CI abundance ratios are Fe 10x more abundant than Al and 300x more abundant than Ti. Therefore, the actual ratio of abundance Al/Fe ~ 20% Ti/Fe ~ 2%. Thus the composition resembles and aerospace alloy of Fe . and ~20%Al and ~2% Ti , that is : ferroaluminum with titanium. This composition can be regarded as only an estimate since the sample was melted and partially burned, and hence its composition was altered from what it possessed originally. Alloys containing Ti, Al and Fe are used in landing gear for jets because of their high strength per weight and shock resistance. [8]

Summary and Discussion

The observed entry velocity of the object to the terrestrial atmosphere, that formed the recovered spherules, was approximately 45km/sec. This is approximately the velocity attained by an object in interstellar space initially at rest with respect to the Solar System falling inward to the Sun and reaching the radius of the Earth's orbit, R_E . This can be seen from the equation for the Earth's orbital velocity around the Sun , which is basically circular, and thus is simply given by V_{orbit}= (GM_{Sun}/R_E)½ ≅ 30km.sec where M_{Sun} and G is Newtons Gravitation constant. The velocity of free fall from interstellar space for an object initially at rest relative to the Sun, inward towards the radius of Earth's orbit V_{Int} can be written approximately

$$V_{Int} = \sqrt{\frac{2GM_{Sun}}{R_E}} \cong \sqrt{2}\ V_{orbit} \qquad (3)$$

Which yields V_{Int} ≅42km/sec, for the object, where to this is would be added an additional 11km/sec due to the effect of Earth's gravity for an approximate speed, which would also depend on poorly known details of approach geometry, initial velocity in interstellar space, and any gravity effects of the outer planets encountered on its inward journey. This gives an estimated speed into Earth's atmosphere of ~ 50km/sec. This is consistent with the finding, based on iron isotopes in the spherules, of an interstellar origin of the object.

The near absence of nickel in the spherules argues against the possibility that this object was a product of natural processes, whereas the high strength and temperature resistance of the object before molten disassembly, together with its compositional abundance of titanium and aluminum argues for a technological source.

The recovered spherules from the ocean bottom off of Papua New therefore appear consistent with disassembled molten debris formed by the impact into the atmosphere of a high speed interstellar spacecraft with a hull composed of a high strength Titanium-Aluminum Steel alloy. Additionally, the pattern of elevated U, Be and Li in the samples appears consistent with the scenario of such an impacting craft carrying Thermonuclear charges.

Taken together, the simplest scenario to explain these findings suggests that the recovered exotic spherules represent part of a nuclear-charge-propelled interstellar probe, similar to designs from the proposed Orion Project. In such a suggested scenario the probe was aimed at Earth, with the capability of slowing down near this planet to assume a stable orbit around it, but was instead allowed to impact harmlessly after gathering data, in order to avoid near-Earth thermonuclear explosions-such explosions being recognized as possibly alarming to Earth's easily detected, and also easily alarmed, inhabitants. A harmless impact would also destroy any details of the probe's technology. Alternatively, such an interstellar probe, aimed to investigate Earth from an orbit around it, suffered a failure of its thermonuclear final "braking charges" to deploy, and thus impacted instead. In either case no hostile intent to the conjectural probe's creators can be imputed, only curiosity.

In any case, it is possible we have been "discovered" by some other extrasolar culture. Humanity therefore, owes a great debt to Professor Avi Loeb and his collaborators for his courageous and ingenious pursuit of this inquiry.

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