

Executive Summary of visit to Defkalion Headquarters, Athens Greece March 2nd – 6th

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Summary of Activities

Day 1 – March 2nd Friday – Met with Alex Xanthoulis and associates and discussed plans for the days ahead over coffee at Alex's favorite coffee house

Day 2 – March 3rd Saturday – Met with John Hadjichristos and discussed details of the technology including confidential drawings, details about R&D and internals of the reaction

Day 3 – March 4th Sunday – Spent the day with Alex and his wife at his home. Also visited Acropolis museum.

Day 4 – March 5th Monday – Met with John Hadjichristos to go over data from a typical run of a single reactor

Day 5 – March 6th Tuesday – Met one more time with John Hadjichristos with follow up questions/clarifications

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Similarities Between Andrea Rossi Technology and Defkalion

- 1) Use of micron sized nickel powder and pressurized hydrogen gas to create a nuclear reaction
- 2) Gamma radiation below 300 Kev is generated from the reaction
- 3) Use of heat is required to initiate the nuclear reaction
- 4) Use of electrical signal to separate H₂ into H (Rossi never publicly claimed this)
- 5) Use of the catalyst Potassium as well as other unknown ingredients is required.
- 6) Surface area of the powder must be enhanced by a proprietary method
- 7) Transmutations of Iron, Zinc, and Copper have been seen in the spent powder

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Differences Between Andrea Rossi Technology and Defkalion

- 1) Pressure of Hydrogen is only 1 to 5 bars for DK versus 24 bars for Rossi. It is now known that Rossi allowed leaking hydrogen to escape into water surrounding chamber.
- 2) Triggering for Rossi was by thermal and now we understand chemical. DK using modified auto sparkplug with frequency input.
- 3) Rossi continued to input heat after reaction starts. DK requires no input of heat after start of reaction.
- 4) Rossi chamber was made of copper surrounded by water. DK chamber is made of 316 Stainless Steel with flow channels surrounding in chamber walls.
- 5) Rossi had a slow shut down. DK shuts down instantly by bleeding H₂ off of the chamber. Can also use magnetics.

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Differences Between Andrea Rossi Technology and Defkalion

- 6) Rossi used water to cool his reactor. DK uses a thermal fluid with high boiling point.
- 7) Rossi claimed to run at 100 degrees C. DK can only run as low as 185 degrees C.
- 8) Rossi claimed that the lead absorbed the gamma radiation to make the heat. DK says gamma radiation is thermalized into IR photons possibly by W-L theory.
- 9) Rossi shielded his reactors with lead and boric acid. DK does not seem to use any shielding at all.
- 10) Rossi claimed to increase the isotopic ratio of NI62 and NI64. DK does not.
- 11) Rossi claimed that only the NI62 and NI64 participates in the reaction. DK claims evidence of NI58 and NI60 participation as well.

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Differences Between Andrea Rossi Technology and Defkalion

- 12) Rossi never seemed to get his temperature much above 100 C. (Actually we never knew interior temp cause he had no temperature sensor there) DK can sustain at 450 C and have gone to 650 C as well as melting point of nickel.

Technical Summary of the Reaction as Provided by John Hadjichristos

- 1) DK chose to focus on what is required to trigger the reaction as opposed to coefficient of performance of the reaction after it has been started. This allows for the reaction to be sustained at a range of temperatures from 200 degrees C to 600 degrees C.
- 2) The Nickel powder must first be heated before the reaction can be initiated. This causes the various isotopes in the Nickel lattice structure to cause imperfections in the Nickel at a starting temperature of 500 degrees C. Addition additives are required to aid the reaction.
- 3) The Hydrogen must then be separated from diatomic to monatomic Hydrogen. This is done electrically. This is an endothermic process that can be monitored by temperature in a feedback control loop.

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Technical Summary of the Reaction as Provided by John Hadjichristos

4) The triggering of the reaction is a 3 stage process:

Stage 1 - Separate H₂ into H (diatomic to monatomic)

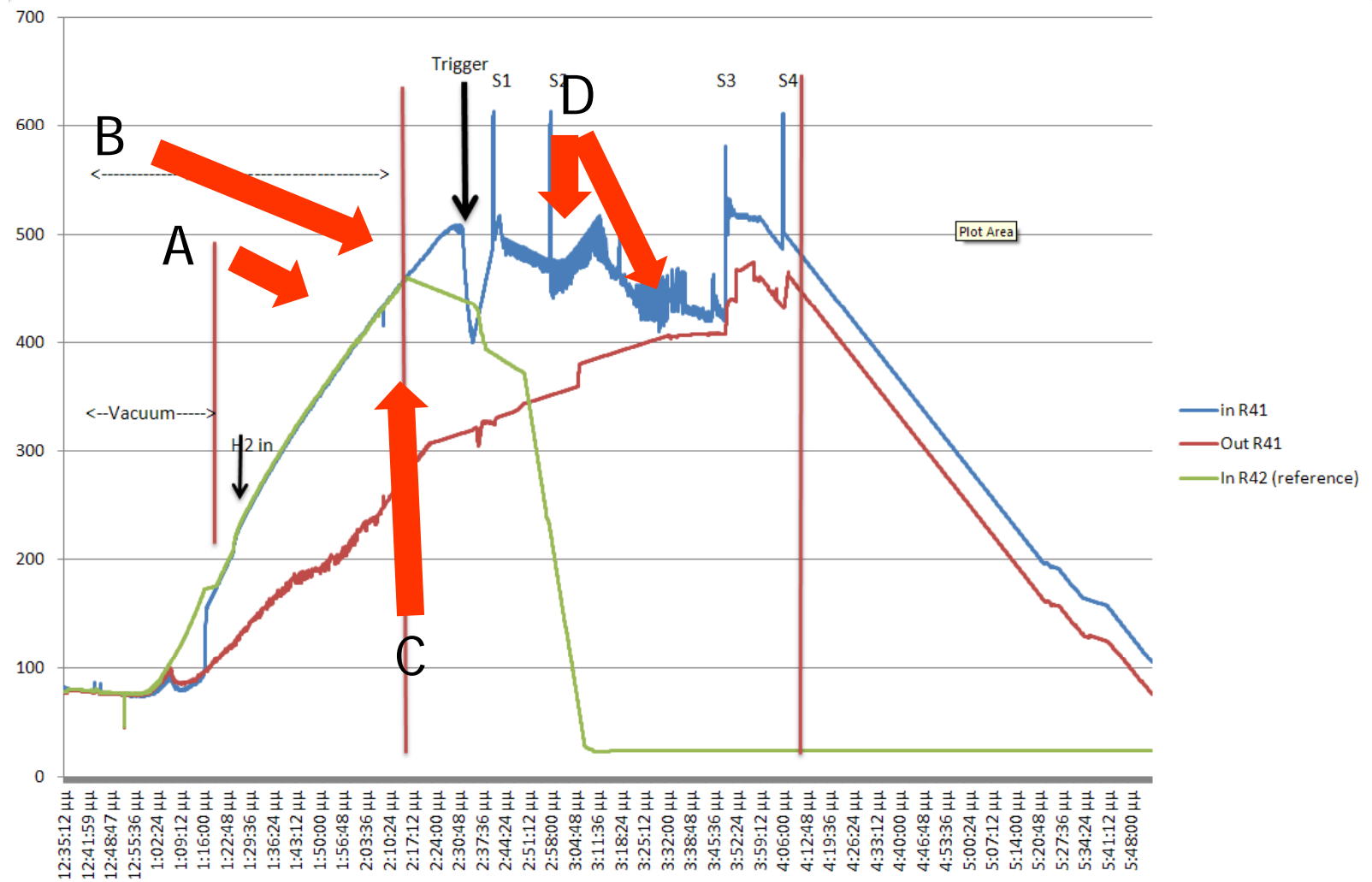
Stage 2 - Polarize the H atom by elongating the orbit of the single electron allowing columbic barrier insertion via virtual neutron path causing gamma radiation

Stage 3 – Finish out absorption and transformation of the gamma radiation created in stage 2 into heat in stage 3 by the steps as described by Widom Larsen theory.

5) Once the reaction has been initiated, the heating element is no longer needed. As long as the hydrogen does not leak out and its pressure is maintained the reaction can be sustained for months. Argon may be used to keep the internal pressure of the chamber at operating pressures.

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Notes on Data from Typical Run Provided by John Hadjichristos



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Notes on Data from Typical Run Provided by John Hadjichristos

- The green trace in the graph above is the reference chamber with no Nickel Powder present. The red trace is the outside temperature of the active chamber and the blue trace is the interior temperature of the active chamber.
- You can see in the graph that at A on the chart when the heating element is turned off in the reference chamber, the temperature immediately begins to fall.
- From A to B, the temperature of the active chamber continues to rise prior to initiation of triggering. This is explained as a chemical reaction occurring between the 3 components added to the Nickel Powder to enhance the reaction 1 of which is Potassium Carbonate.

Notes on Data from Typical Run Provided by John Hadjichristos

- From B to C the temperature drops after triggering is initiated. This was explained as being caused by the endothermic process of H_2 being transformed into H. This 'V' is always seen when starting with diatomic H. A feedback control loop is placed on initial triggering to stop after the temperature bottoms out and goes back up at C. Triggering is done at a proprietary frequency to be most effective.
- After H_2 has been converted to H, then the temperature is monitored and triggering is initiated periodically to maintain the temperature within a 300 to 500 degrees C.
- Notice at D there are temperature spikes. These appeared without triggering and are something that is not desired.

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Notes on Data from Typical Run Provided by John Hadjichristos

- From B to C is where stage 1, 2, and 3 of the reaction begin to occur and is where the most gamma radiation is seen.
- Gamma radiation from subsequent triggering is less after all of the H₂ has been converted to H.
- Stages 1, 2, and 3 occur so rapidly as to appear to be a single event but are believed to be separate events occurring in sequence. John Hadjichristos explained that the amount of time the electron of a polarized H atom is close enough to the nucleus to appear to be a virtual neutron (stage 2) is 1×10^{-17} seconds. John believes gamma radiation is not seen as the reaction stabilizes because the gamma radiation produced in stage 2 is completely balanced by its absorption in stage 3. The final product is photons in the IR region from stage 3.

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My Impressions of Defkalion

- Alex Xanthoulis was a very gracious host to both Tom and myself inviting us into his home while we were there.
- John Hadjichristos answered all of my questions except those that they felt were key proprietary information that they could not share at this time.
- I was surprised at the amount of detail they were willing to give me. While I did not sign an NDA I did make a verbal agreement to not divulge what I had seen or heard and I also explained that I was required by federal law to hold their information as proprietary even without an NDA.
- Even though I did not see a demonstration of this technology I do feel that they have engineered this beyond anything Rossi showed us or Piantelli.

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My Impressions of Defkalion

- Staff members of Defkalion that I spoke with do not appear to be fabricating information for a show. What they talked to me about and the answers they gave me to my questions seemed to be based on experience that they have gained through trial and error with many different aspects of this technology.
- What Rossi gave them was an assurance that this reaction was real. From there they seem to have come up with their own approach to triggering and their own refinements to sustaining and controlling the reaction. They are filing for 6 different patents related to this.
- I do feel this deserves further investigation to allow them to demonstrate that they are getting energy out in excess of what can be produced by chemical means.

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