1
00:00:03,300 --> 00:00:09,670
[Music]

2
00:00:15,380 --> 00:00:12,650
hello everyone my name is Alba dmitrieva

3
00:00:17,030 --> 00:00:15,390
I'm a graduate student from the

4
00:00:19,130 --> 00:00:17,040
University across the street I think

5
00:00:19,760 --> 00:00:19,140
this way so it's Colorado University at

6
00:00:24,260 --> 00:00:19,770
Boulder

7
00:00:30,010 --> 00:00:24,270
I'm also employee of coalescence and

8
00:00:35,090 --> 00:00:30,020
Rick just gave a perfect example of

9
00:00:38,000 --> 00:00:35,100
these studies we deal with so I will be

10
00:00:39,860 --> 00:00:38,010
concluding this session today on the

11
00:00:43,960 --> 00:00:39,870
exciting and controversial subject of

12
00:00:47,389 --> 00:00:43,970
the cold fusion with reporting by

13
00:00:50,030 --> 00:00:47,399

reporting about two and a half years of

14
00:00:55,910 --> 00:00:50,040
the experimental work that's been done

15
00:00:58,760 --> 00:00:55,920
on the gas loading experiments so one

16
00:01:01,850 --> 00:00:58,770
more thing I want to say before I go

17
00:01:06,139 --> 00:01:01,860
into my presentation if you find the

18
00:01:08,060 --> 00:01:06,149
results interesting if you want to know

19
00:01:10,670 --> 00:01:08,070
more about experimental Studies on the

20
00:01:14,990 --> 00:01:10,680
cold fusion please talk to leek or talk

21
00:01:18,920 --> 00:01:15,000
to me we would love to go into details

22
00:01:24,350 --> 00:01:18,930
because as always the devil is in the

23
00:01:26,539 --> 00:01:24,360
details so anyway I'm going to start my

24
00:01:30,020 --> 00:01:26,549
presentation with the brief overview of

25
00:01:32,330 --> 00:01:30,030
the history of the cold fusion and I'll

26
00:01:35,810 --> 00:01:32,340
talk a little bit more about the

27
00:01:37,219 --> 00:01:35,820
difference between different experiments

28
00:01:40,969 --> 00:01:37,229
the difference between the electrolytic

29
00:01:43,399 --> 00:01:40,979
experiments and they differ in about the

30
00:01:46,609 --> 00:01:43,409
gas loading experiments and that is what

31
00:01:48,320 --> 00:01:46,619
I am working on you will see the

32
00:01:51,109 --> 00:01:48,330
experimental results I will talk about

33
00:01:55,460 --> 00:01:51,119
the excess heat generation mechanisms

34
00:02:02,420 --> 00:01:55,470
the concept of fuel and then I will just

35
00:02:05,480 --> 00:02:02,430
present my conclusions so in 1989 Martin

36
00:02:07,580 --> 00:02:05,490
Fleischmann and Stanley pons ran the

37
00:02:09,949 --> 00:02:07,590
experiment and the results of those

38
00:02:12,550 --> 00:02:09,959

experiments could not be explained from

39
00:02:17,060 --> 00:02:12,560
the conventional chemistry point of view

40
00:02:21,560 --> 00:02:17,070
their electrochemical cell generated

41
00:02:22,540 --> 00:02:21,570
more heat than it was provided with so

42
00:02:25,600 --> 00:02:22,550
what

43
00:02:28,540 --> 00:02:25,610
is the electrochemical cell it's as you

44
00:02:31,360 --> 00:02:28,550
are with heavy water and the electrode

45
00:02:33,880 --> 00:02:31,370
as an electrolyte and the electrical

46
00:02:37,960 --> 00:02:33,890
current is supplied to it so you can see

47
00:02:40,990 --> 00:02:37,970
the Palladium cathode once again the

48
00:02:44,560 --> 00:02:41,000
power they have supplied to this to this

49
00:02:49,770 --> 00:02:44,570
cell actually was less than the access

50
00:02:57,220 --> 00:02:53,410
okay you know what sorry this there's a

51
00:02:58,930 --> 00:02:57,230
missing picture so you won't you won't

52
00:03:03,220 --> 00:02:58,940
see the picture I'll try to explain it

53
00:03:05,310 --> 00:03:03,230
in words what I'm trying to say is what

54
00:03:07,930 --> 00:03:05,320
is what in cold fusion just see on those

55
00:03:11,320 --> 00:03:07,940
things we really need to make the cold

56
00:03:13,720 --> 00:03:11,330
fusion work so the isotopes deuterium

57
00:03:16,890 --> 00:03:13,730
and hydrogen what is the difference

58
00:03:19,360 --> 00:03:16,900
between between them so hydrogen is

59
00:03:23,230 --> 00:03:19,370
proton was the electron that goes around

60
00:03:25,300 --> 00:03:23,240
it deuterium is the same kind of

61
00:03:27,940 --> 00:03:25,310
hydrogen but it has one additional thing

62
00:03:30,850 --> 00:03:27,950
its nucleus it has a neutron

63
00:03:33,130 --> 00:03:30,860

so the isotope of hydrogen is deuterium

64
00:03:37,090 --> 00:03:33,140
and the isotope of water which is h2o

65
00:03:40,210 --> 00:03:37,100
h2o would be a heavy water d2o

66
00:03:45,610 --> 00:03:40,220
so we need a source of deuterium atoms

67
00:03:49,330 --> 00:03:45,620
to make a cold fusion happen what those

68
00:03:52,600 --> 00:03:49,340
deuterium atoms are need for they

69
00:03:56,680 --> 00:03:52,610
actually can fuse together and produce a

70
00:03:58,690 --> 00:03:56,690
new particle in this particular example

71
00:04:01,810 --> 00:03:58,700
it's a helium particle but there could

72
00:04:04,990 --> 00:04:01,820
be some other things so new particle is

73
00:04:07,090 --> 00:04:05,000
produced and also there's a energy

74
00:04:08,130 --> 00:04:07,100
released as a result of this nuclear

75
00:04:13,630 --> 00:04:08,140
fusion

76
00:04:17,199 --> 00:04:13,640
so we have our deuterium atoms but they

77
00:04:19,690 --> 00:04:17,209
won't just fuse oh sudden we need a

78
00:04:22,510 --> 00:04:19,700
special environment for that fusion to

79
00:04:25,500 --> 00:04:22,520
happen so we need this palladium metal

80
00:04:27,490 --> 00:04:25,510
and most of the cold fusion experiments

81
00:04:31,990 --> 00:04:27,500
successful replication has been done

82
00:04:33,370 --> 00:04:32,000
with palladium so what do we measure so

83
00:04:35,170 --> 00:04:33,380
we have a choice of measuring either

84
00:04:36,490 --> 00:04:35,180
particles that's been produced and we

85
00:04:40,060 --> 00:04:36,500
talked about for example

86
00:04:43,600 --> 00:04:40,070
particles or we can look at the energy

87
00:04:48,640 --> 00:04:43,610
which been which has been released as a

88
00:04:50,290 --> 00:04:48,650

result of this reaction and in most in

89
00:04:56,110 --> 00:04:50,300
most of the cold fusion experiments it

90
00:04:58,810 --> 00:04:56,120
usually people measure heat so why do we

91
00:05:00,850 --> 00:04:58,820
even deviate from the original freshman

92
00:05:02,890 --> 00:05:00,860
and pong experiment pants experiment why

93
00:05:05,020 --> 00:05:02,900
don't we just keep doing it and doing it

94
00:05:09,190 --> 00:05:05,030
and doing it the thing is and this is a

95
00:05:11,950 --> 00:05:09,200
major cold fusion problem the cold

96
00:05:14,980 --> 00:05:11,960
fusion science problem it's really hard

97
00:05:19,030 --> 00:05:14,990
to replicate those experiments so the

98
00:05:21,640 --> 00:05:19,040
replication rate was very low and at

99
00:05:24,880 --> 00:05:21,650
some point scientists have started

100
00:05:27,190 --> 00:05:24,890
looking for that one experiment that

101
00:05:28,840 --> 00:05:27,200
maybe not produced too much heat but at

102
00:05:31,090 --> 00:05:28,850
least this is something that you can run

103
00:05:33,850 --> 00:05:31,100
every time and every time we'll get the

104
00:05:36,280 --> 00:05:33,860
results so if he can make something to

105
00:05:42,070 --> 00:05:36,290
work every time then we can study it and

106
00:05:44,409 --> 00:05:42,080
it seems like about seven years ago this

107
00:05:46,780 --> 00:05:44,419
kind of experiment was found and this is

108
00:05:49,180 --> 00:05:46,790
a gas loading experiment and it was

109
00:05:53,409 --> 00:05:49,190
showing the consistent results every

110
00:05:59,950 --> 00:05:53,419
time you run it so the results being

111
00:06:02,560 --> 00:05:59,960
reported by Japanese some replications

112
00:06:04,990 --> 00:06:02,570
done in Italy here in the United States

113
00:06:09,310 --> 00:06:05,000

it was a novel research lab did a very

114
00:06:13,659 --> 00:06:09,320
extensive study and here in Boulder we

115
00:06:19,060 --> 00:06:13,669
also got positive consistent

116
00:06:22,330 --> 00:06:19,070
replications so that is the gas loading

117
00:06:24,310 --> 00:06:22,340
system I'm going to talk about and this

118
00:06:27,280 --> 00:06:24,320
is the system we have two of them and

119
00:06:30,460 --> 00:06:27,290
they've been running 24/7 for the last

120
00:06:33,820 --> 00:06:30,470
two and a half years so the system

121
00:06:37,270 --> 00:06:33,830
consists of the be called isothermal

122
00:06:39,460 --> 00:06:37,280
chamber or oven and you can see those

123
00:06:41,740 --> 00:06:39,470
stainless steel vessels that is

124
00:06:45,490 --> 00:06:41,750
something where we put our sample our

125
00:06:46,810 --> 00:06:45,500
powders and we can supply gas through

126
00:06:49,090 --> 00:06:46,820
the gas lines

127
00:06:52,390 --> 00:06:49,100
it can be hydrogen deuterium argon

128
00:06:56,170 --> 00:06:52,400
helium so what we do is recycle this gas

129
00:06:56,680 --> 00:06:56,180
so the gas goes in system is under the

130
00:07:00,760 --> 00:06:56,690
pressure

131
00:07:04,450 --> 00:07:00,770
then we evacuate the gas so what we look

132
00:07:06,570 --> 00:07:04,460
what we are looking for is the change of

133
00:07:10,420 --> 00:07:06,580
the temperature so if the net

134
00:07:16,330 --> 00:07:10,430
temperature change is positive then we

135
00:07:18,730 --> 00:07:16,340
know that we have an excess heat and I'm

136
00:07:22,020 --> 00:07:18,740
sorry there's another picture missing

137
00:07:29,260 --> 00:07:27,100
and that is what goes in in the in the

138
00:07:29,500 --> 00:07:29,270

vessels this is a powder I was talking

139
00:07:32,890 --> 00:07:29,510
about

140
00:07:35,260 --> 00:07:32,900
if consists on of the palladium

141
00:07:37,600 --> 00:07:35,270
nanoparticles very small palladium

142
00:07:41,410 --> 00:07:37,610
particles I'm not going to into details

143
00:07:43,300 --> 00:07:41,420
how we make these materials but it's

144
00:07:46,000 --> 00:07:43,310
it's not very it's not very difficult

145
00:07:50,470 --> 00:07:46,010
and it's a very well described procedure

146
00:07:53,470 --> 00:07:50,480
and it's very well described by chemists

147
00:07:57,760 --> 00:07:53,480
because this is the perfect example of

148
00:08:01,830 --> 00:07:57,770
the catalytic material it's a catalyst

149
00:08:04,090 --> 00:08:01,840
so is that a coincidence that those

150
00:08:05,890 --> 00:08:04,100
successful replication of the cold

151
00:08:07,600 --> 00:08:05,900
fusion experiments being done with the

152
00:08:10,260 --> 00:08:07,610
material that's been studied for more

153
00:08:13,230 --> 00:08:10,270
than hundred years which is a catalyst I

154
00:08:19,720 --> 00:08:13,240
don't think so

155
00:08:22,480 --> 00:08:19,730
what you see here is an explanation how

156
00:08:27,280 --> 00:08:22,490
palladium not a particle palladium

157
00:08:30,250 --> 00:08:27,290
catalyst can really promote one very

158
00:08:32,709 --> 00:08:30,260
interesting chemical reaction and the

159
00:08:35,380 --> 00:08:32,719
result of this chemical reaction can be

160
00:08:38,680 --> 00:08:35,390
the access heat not not access heat and

161
00:08:41,260 --> 00:08:38,690
the thermic heat this reaction called

162
00:08:44,740 --> 00:08:41,270
the HD exchange reaction and what

163
00:08:49,030 --> 00:08:44,750

happens is deuterium exchanges with

164
00:08:51,850 --> 00:08:49,040
hydrogen and it produces heat it's not

165
00:08:55,240 --> 00:08:51,860
too much heat but it's enough to explain

166
00:08:59,019 --> 00:08:55,250
those results to the other groups been

167
00:09:00,910 --> 00:08:59,029
demonstrating well including us so

168
00:09:03,160 --> 00:09:00,920
and that's what people been doing

169
00:09:08,730 --> 00:09:03,170
they've been taking this material given

170
00:09:12,400 --> 00:09:08,740
a deuterium and observe some some heat

171
00:09:16,240 --> 00:09:12,410
the thing about the HT exchange reaction

172
00:09:18,429 --> 00:09:16,250
that you can actually reverse it and if

173
00:09:21,189 --> 00:09:18,439
you do this right way in the right

174
00:09:24,730 --> 00:09:21,199
environment then you can make this

175
00:09:27,879 --> 00:09:24,740
reaction and the thermic and you will be

176
00:09:32,499 --> 00:09:27,889
absorbing heat so instead of excess

177
00:09:35,290 --> 00:09:32,509
heating you will see cooling and then we

178
00:09:37,840 --> 00:09:35,300
thought that okay if we do it this way

179
00:09:41,319 --> 00:09:37,850
if we find the right way to do it and we

180
00:09:43,929 --> 00:09:41,329
can prove that we can show only not only

181
00:09:47,829 --> 00:09:43,939
heating but also cooling that will prove

182
00:09:49,780 --> 00:09:47,839
that the source of that excess heat or

183
00:09:53,670 --> 00:09:49,790
anomalous heat it's actually chemistry

184
00:09:59,710 --> 00:09:53,680
and there is nothing anomalous about it

185
00:10:05,829 --> 00:09:59,720
so we ran that experiment in those

186
00:10:09,460 --> 00:10:05,839
special conditions and the results you

187
00:10:11,079 --> 00:10:09,470
can see them here when we start with

188
00:10:12,460 --> 00:10:11,089

deuterium pressurization we have the

189
00:10:13,660 --> 00:10:12,470
excess heat don't be fooled by this

190
00:10:18,009 --> 00:10:13,670
negative numbers

191
00:10:19,360 --> 00:10:18,019
that is how chemists describe the exit

192
00:10:22,150 --> 00:10:19,370
thermic reaction the enthalpy is

193
00:10:24,280 --> 00:10:22,160
negative so even though those bars and

194
00:10:27,549 --> 00:10:24,290
each bar actually corresponding to the

195
00:10:31,329 --> 00:10:27,559
excess heat that been released during

196
00:10:33,939 --> 00:10:31,339
one cycle so this bars are negative but

197
00:10:36,869 --> 00:10:33,949
that means the system generates Heat and

198
00:10:39,429 --> 00:10:36,879
you can see the sequence of France

199
00:10:41,379 --> 00:10:39,439
increasing and at the same time the

200
00:10:43,540 --> 00:10:41,389
energy released by the system is

201
00:10:48,129 --> 00:10:43,550
decreasing it seems like we have some

202
00:10:51,699 --> 00:10:48,139
fuel which we are using up and then we

203
00:10:53,740 --> 00:10:51,709
switch the gas to hydrogen and all of

204
00:10:58,660 --> 00:10:53,750
sudden we have the cooling we have the

205
00:11:00,939 --> 00:10:58,670
endothermic reaction going so we kind of

206
00:11:02,829 --> 00:11:00,949
proved well we proved the hypothesis

207
00:11:06,069 --> 00:11:02,839
which I showed on the previous slide

208
00:11:08,439 --> 00:11:06,079
which explained the H the exchange so

209
00:11:10,240 --> 00:11:08,449
after some hydrogen pressurization you

210
00:11:11,840 --> 00:11:10,250
can see the endothermic it also goes

211
00:11:14,470 --> 00:11:11,850
away so the cooling

212
00:11:21,499 --> 00:11:14,480
going away we switch it to hydrogen and

213
00:11:23,509 --> 00:11:21,509

we regenerate that heat back well what

214
00:11:27,170 --> 00:11:23,519
does it mean it means there is some fuel

215
00:11:29,540 --> 00:11:27,180
trapped in the material and by

216
00:11:32,269 --> 00:11:29,550
alternating the gases hydrogen and

217
00:11:34,220 --> 00:11:32,279
deuterium we can actually engage the

218
00:11:37,040 --> 00:11:34,230
reactions either exothermic or

219
00:11:40,040 --> 00:11:37,050
endothermic the question is was the fuel

220
00:11:42,410 --> 00:11:40,050
and the fuel is water introduced to

221
00:11:45,050 --> 00:11:42,420
Tyrion we exchange it in water then we

222
00:11:48,079 --> 00:11:45,060
can be introduced hydrogen and exchanged

223
00:11:51,829 --> 00:11:48,089
it in heavy water so water is the source

224
00:11:54,499 --> 00:11:51,839
of that heat and if the water is the

225
00:11:56,840 --> 00:11:54,509
fuel for this reaction what if we remove

226
00:12:00,019 --> 00:11:56,850
it what if you make our material toward

227
00:12:06,550 --> 00:12:00,029
a completely water free that will

228
00:12:14,949 --> 00:12:10,160
how do you get rid of water probably the

229
00:12:17,840 --> 00:12:14,959
most common way would be just to bake it

230
00:12:20,389 --> 00:12:17,850
100 degrees is not enough 100 degrees

231
00:12:23,749 --> 00:12:20,399
won't make that powder water free we

232
00:12:26,499 --> 00:12:23,759
have to go higher and we went up to 390

233
00:12:28,790 --> 00:12:26,509
degrees and then we cooled down system

234
00:12:30,439 --> 00:12:28,800
everything is done in vacuum we cooled

235
00:12:33,889 --> 00:12:30,449
down system back to the room temperature

236
00:12:36,470 --> 00:12:33,899
and we didn't see any excess heat

237
00:12:40,670 --> 00:12:36,480
neither with hydrogen or deuterium no

238
00:12:43,280 --> 00:12:40,680

heat no cooling nothing so we got rid of

239
00:12:45,590 --> 00:12:43,290
water we killed the reaction we didn't

240
00:12:47,960 --> 00:12:45,600
stop there we actually took the powder

241
00:12:50,090 --> 00:12:47,970
outside of the system put it in the

242
00:12:53,480 --> 00:12:50,100
petri dish and put it on the scale and

243
00:12:57,710 --> 00:12:53,490
just watch the weight increasing and

244
00:13:00,199 --> 00:12:57,720
within 24 hours it's actually gained 5

245
00:13:03,379 --> 00:13:00,209
percent and that 5 percent was water

246
00:13:05,960 --> 00:13:03,389
there was a moisture from the air and

247
00:13:12,319 --> 00:13:05,970
even here in the dry Colorado it was

248
00:13:14,240 --> 00:13:12,329
enough to make enough fuel for the for

249
00:13:17,449 --> 00:13:14,250
the reaction because then we loaded this

250
00:13:19,699 --> 00:13:17,459
powder back to the system and ran

251
00:13:22,309 --> 00:13:19,709
hydrogen and deuterium and we saw that

252
00:13:25,280 --> 00:13:22,319
that access heating and access cooling

253
00:13:30,079 --> 00:13:25,290
came back so we proved that the

254
00:13:34,069 --> 00:13:30,089
you'll was indeed a water and it'll be

255
00:13:37,610 --> 00:13:34,079
nice to kind of say well that's it

256
00:13:40,100 --> 00:13:37,620
mystery solved but there were some very

257
00:13:42,980 --> 00:13:40,110
interesting reports done by the other

258
00:13:46,129 --> 00:13:42,990
groups they were saying that they

259
00:13:48,800 --> 00:13:46,139
consistently see something really

260
00:13:51,439 --> 00:13:48,810
unexplainable whenever they go to the

261
00:13:53,389 --> 00:13:51,449
higher temperatures so as I said most of

262
00:13:55,639 --> 00:13:53,399
our experiments been done at 40 degrees

263
00:13:58,850 --> 00:13:55,649

but people are saying well if you go to

264
00:14:04,240 --> 00:13:58,860
108 if you go to 200 400 then you start

265
00:14:08,150 --> 00:14:04,250
seeing something truly unexplainable and

266
00:14:10,220 --> 00:14:08,160
obviously we just decided that we

267
00:14:13,900 --> 00:14:10,230
absolutely need to replicate those

268
00:14:16,400 --> 00:14:13,910
conditions and see what what's happening

269
00:14:20,210 --> 00:14:16,410
so we went to the higher temperatures

270
00:14:22,610 --> 00:14:20,220
and yes we've seen some unexplained

271
00:14:26,030 --> 00:14:22,620
heating and cooling at those elevated

272
00:14:30,319 --> 00:14:26,040
temperatures so now I'm going to talk

273
00:14:34,180 --> 00:14:30,329
about more about measurement system and

274
00:14:38,689 --> 00:14:34,190
what kind of nasty tricks it can play

275
00:14:40,550 --> 00:14:38,699
with you and how you can be well you

276
00:14:44,389 --> 00:14:40,560
have to be aware of them and also you

277
00:14:47,290 --> 00:14:44,399
have to know how to overcome those those

278
00:14:52,009 --> 00:14:47,300
measurement errors and and difficulties

279
00:14:54,439 --> 00:14:52,019
so the excess heat generation under gas

280
00:14:57,319 --> 00:14:54,449
pressure so whenever we had a guess in

281
00:15:01,129 --> 00:14:57,329
the system we saw that unexplained heat

282
00:15:03,559 --> 00:15:01,139
and the temperatures in our system had

283
00:15:05,689 --> 00:15:03,569
to be more than 250 that that's when you

284
00:15:08,179 --> 00:15:05,699
see it if you below 250 there's nothing

285
00:15:12,230 --> 00:15:08,189
unusual going on the interesting thing

286
00:15:14,720 --> 00:15:12,240
is it was the same excess heat

287
00:15:16,370 --> 00:15:14,730
generation for hydrogen and deuterium

288
00:15:20,629 --> 00:15:16,380

there is no difference between hydrogen

289
00:15:23,410 --> 00:15:20,639
and deuterium and it was lasting forever

290
00:15:31,519 --> 00:15:23,420
as long as you have a guess you have

291
00:15:34,260 --> 00:15:31,529
your unexplained temperature change and

292
00:15:36,570 --> 00:15:34,270
that that was that was

293
00:15:39,750 --> 00:15:36,580
a little bit upsetting because that

294
00:15:41,910 --> 00:15:39,760
excess heat generation really depends on

295
00:15:43,920 --> 00:15:41,920
the vessel location inside the oven you

296
00:15:46,890 --> 00:15:43,930
move your vessel back I mean you move it

297
00:15:48,330 --> 00:15:46,900
right or left a couple inches and you

298
00:15:52,250 --> 00:15:48,340
have this effect and then you lose this

299
00:15:57,570 --> 00:15:52,260
effect or you enhance this effect so it

300
00:16:00,360 --> 00:15:57,580
seemed like this is something something

301
00:16:03,530 --> 00:16:00,370
about the system that produces this

302
00:16:06,330 --> 00:16:03,540
artifact and what you see here is the

303
00:16:08,940 --> 00:16:06,340
picture of inside of the oven

304
00:16:11,850 --> 00:16:08,950
inside of the system so how do we

305
00:16:14,640 --> 00:16:11,860
actually go to those higher temperatures

306
00:16:16,260 --> 00:16:14,650
250 degrees we have this oven and there

307
00:16:18,510 --> 00:16:16,270
is a heater on the back panel of the

308
00:16:22,110 --> 00:16:18,520
oven and there's a fan it actually blows

309
00:16:24,960 --> 00:16:22,120
the hot air in the oven I have to say

310
00:16:28,110 --> 00:16:24,970
right away this is a commercial system

311
00:16:31,290 --> 00:16:28,120
it actually was built to keep the

312
00:16:34,860 --> 00:16:31,300
control temperature in the range of 10

313
00:16:37,530 --> 00:16:34,870

Mille kelvins so it is really good but

314
00:16:41,430 --> 00:16:37,540
still not good enough at the higher

315
00:16:43,320 --> 00:16:41,440
temperature settings this airflow is not

316
00:16:45,810 --> 00:16:43,330
that uniform anymore and we have a

317
00:16:49,350 --> 00:16:45,820
temperature gradient across the oven so

318
00:16:49,860 --> 00:16:49,360
we have some of the corners let's say of

319
00:16:52,170 --> 00:16:49,870
the oven

320
00:16:57,630 --> 00:16:52,180
hotter than another one so we have a

321
00:17:01,140 --> 00:16:57,640
heat flow across across the oven how

322
00:17:04,440 --> 00:17:01,150
does it hurt us let's say we have those

323
00:17:07,800 --> 00:17:04,450
random hot or cold spots across the oven

324
00:17:10,440 --> 00:17:07,810
then if the hot spot is somewhere close

325
00:17:13,290 --> 00:17:10,450
to the vessel in the absence of gas in

326
00:17:15,660 --> 00:17:13,300
the vacuum our temperature sensor

327
00:17:17,280 --> 00:17:15,670
measures one temperature t2 let's say

328
00:17:20,670 --> 00:17:17,290
because some of the heat will be lost

329
00:17:22,560 --> 00:17:20,680
due to transfer and when we bring the

330
00:17:24,390 --> 00:17:22,570
gas in there is some kind of action the

331
00:17:26,460 --> 00:17:24,400
gas is moving also the gas has some

332
00:17:29,700 --> 00:17:26,470
thermal conductivity assigned to it

333
00:17:31,770 --> 00:17:29,710
right so it actually makes the coupling

334
00:17:34,530 --> 00:17:31,780
of the hot spot to this thermal

335
00:17:38,130 --> 00:17:34,540
temperature sensor much much much better

336
00:17:41,070 --> 00:17:38,140
so we channeling heat inside the vessel

337
00:17:42,930 --> 00:17:41,080
and the gas helping us to do this more

338
00:17:45,960 --> 00:17:42,940

efficiently so now we measure

339
00:17:47,000 --> 00:17:45,970
temperature TT which is more than t2 and

340
00:17:49,700 --> 00:17:47,010
then we removed

341
00:17:51,940 --> 00:17:49,710
yes right and we kind of kill this this

342
00:17:55,040 --> 00:17:51,950
this case we go back to the initial

343
00:17:57,920 --> 00:17:55,050
state so our temperature will drop back

344
00:18:00,730 --> 00:17:57,930
to t2 so that's why whenever we have a

345
00:18:06,430 --> 00:18:00,740
guess we measure temperature higher than

346
00:18:09,650 --> 00:18:06,440
it's supposed to be so we decided to

347
00:18:12,290 --> 00:18:09,660
artificially recreate those thermal

348
00:18:15,410 --> 00:18:12,300
gradients by putting either resistive

349
00:18:20,150 --> 00:18:15,420
heater on the vessel or the cooling

350
00:18:23,540 --> 00:18:20,160
element and we just dissipated heat or

351
00:18:25,600 --> 00:18:23,550
we cool down the vessel once again

352
00:18:29,230 --> 00:18:25,610
intentionally intentionally

353
00:18:33,110 --> 00:18:29,240
so that is the result of that experiment

354
00:18:36,200 --> 00:18:33,120
let's look at this first plot that is

355
00:18:37,970 --> 00:18:36,210
when everything is in equilibrium there

356
00:18:41,240 --> 00:18:37,980
is no temperature gradient in the oven

357
00:18:43,670 --> 00:18:41,250
so what you see here is that is when the

358
00:18:46,850 --> 00:18:43,680
gas is in helium and that's when the

359
00:18:50,690 --> 00:18:46,860
argon is in the system so those tiny

360
00:18:52,700 --> 00:18:50,700
spikes corresponding to the gas flow

361
00:18:55,130 --> 00:18:52,710
into the system get compressed you have

362
00:18:59,240 --> 00:18:55,140
heat and then you pull it out so you

363
00:19:00,890 --> 00:18:59,250

have some cooling totally totally normal

364
00:19:05,800 --> 00:19:00,900
process there is nothing here nothing

365
00:19:11,530 --> 00:19:05,810
unusual now we turn on our tiny heater

366
00:19:14,210 --> 00:19:11,540
so we call it a hot spot on the vessel I

367
00:19:16,790 --> 00:19:14,220
want to emphasize that it's not like

368
00:19:19,610 --> 00:19:16,800
returning on and off this heater this

369
00:19:21,590 --> 00:19:19,620
heater is on all the time what

370
00:19:24,340 --> 00:19:21,600
difference is only the presence of the

371
00:19:27,740 --> 00:19:24,350
gas helium and argon and you can see

372
00:19:32,180 --> 00:19:27,750
whenever the gas is in the system this

373
00:19:35,030 --> 00:19:32,190
temperature is just jump and the base

374
00:19:37,070 --> 00:19:35,040
line is shifted so the shift is

375
00:19:38,990 --> 00:19:37,080
different for helium and organs because

376
00:19:42,140 --> 00:19:39,000
they have different thermal conductivity

377
00:19:44,960 --> 00:19:42,150
we have proved this mechanism is working

378
00:19:47,030 --> 00:19:44,970
also for the cold spot so you can see

379
00:19:51,950 --> 00:19:47,040
this shift is downward so yes it has

380
00:19:55,220 --> 00:19:51,960
explained those results we've been seen

381
00:19:57,200 --> 00:19:55,230
in our oven previously at the higher

382
00:19:59,840 --> 00:19:57,210
temperatures simply because it was

383
00:20:01,240 --> 00:19:59,850
non-uniform temperature environment why

384
00:20:04,340 --> 00:20:01,250
is it simple

385
00:20:07,040 --> 00:20:04,350
because once again people who work at

386
00:20:09,830 --> 00:20:07,050
the higher temperature settings they use

387
00:20:13,010 --> 00:20:09,840
oil heaters they used a hit sleeves

388
00:20:15,560 --> 00:20:13,020

that's how they heat up their material

389
00:20:17,900 --> 00:20:15,570
and if you do it non-uniformly you will

390
00:20:19,460 --> 00:20:17,910
always always be dealing with the

391
00:20:26,180 --> 00:20:19,470
temperature gradient which will cause

392
00:20:31,610 --> 00:20:26,190
this artifact I'm at the point of the

393
00:20:33,800 --> 00:20:31,620
conclusions so what you have seen is not

394
00:20:37,280 --> 00:20:33,810
the result well I didn't show you any

395
00:20:40,640 --> 00:20:37,290
confusion but what I showed you is the

396
00:20:44,030 --> 00:20:40,650
experiments that can actually help the

397
00:20:45,710 --> 00:20:44,040
cold fusion researchers to evaluate the

398
00:20:50,750 --> 00:20:45,720
result of their experiment in the way

399
00:20:56,060 --> 00:20:50,760
they think they can really assess the

400
00:20:59,120 --> 00:20:56,070
chemical heat and they can and they can

401
00:21:01,940 --> 00:20:59,130
I mean they will be aware of the

402
00:21:04,190 --> 00:21:01,950
temperature gradient and if the test the

403
00:21:09,530 --> 00:21:04,200
system was the inert gas they'll be able

404
00:21:12,500 --> 00:21:09,540
to rule out those temperature gradient

405
00:21:15,110 --> 00:21:12,510
artifacts so and that is just a

406
00:21:17,210 --> 00:21:15,120
suggestion it's it's pretty vital for

407
00:21:19,370 --> 00:21:17,220
the cold fusion community to get those

408
00:21:21,590 --> 00:21:19,380
gas loading experiments reproduced in a

409
00:21:23,750 --> 00:21:21,600
way I just showed to rule out the

410
00:21:29,950 --> 00:21:23,760
chemistry and measurement artifacts

411
00:21:29,960 --> 00:21:42,050
we have any questions

412
00:21:42,060 --> 00:21:45,919
[Music]

413
00:21:53,820 --> 00:21:50,340

unicron all since we are at SSE meeting

414
00:21:57,060 --> 00:21:53,830
we we can talk about some magical things

415
00:22:00,180 --> 00:21:57,070
like do you consider possibility that

416
00:22:04,440 --> 00:22:00,190
palladium energy participates in the

417
00:22:06,720 --> 00:22:04,450
process because catalysts like palladium

418
00:22:09,180 --> 00:22:06,730
platinum you cannot explain their

419
00:22:12,690 --> 00:22:09,190
activity without involvement of some

420
00:22:16,289 --> 00:22:12,700
kind of energy what we did we developed

421
00:22:18,419 --> 00:22:16,299
energy of platinum infused and gasoline

422
00:22:22,049 --> 00:22:18,429
so that no other chemicals will

423
00:22:28,760 --> 00:22:22,059
participate in exhaust diminished four

424
00:22:31,680 --> 00:22:28,770
times carbon dioxide in gasoline was

425
00:22:35,100 --> 00:22:31,690
diminishing four times carbon monoxide

426
00:22:37,950 --> 00:22:35,110
and almost eliminated hydrocarbons

427
00:22:40,019 --> 00:22:37,960
so definitely energy participates in the

428
00:22:42,930 --> 00:22:40,029
chemical reactions so is it possible

429
00:22:46,620 --> 00:22:42,940
that palladium energy also participates

430
00:22:48,840 --> 00:22:46,630
here okay so I said I mentioned that

431
00:22:49,799 --> 00:22:48,850
those catalysts have been studied for

432
00:22:53,190 --> 00:22:49,809
hundred years

433
00:22:55,440 --> 00:22:53,200
the sad part is that even after those

434
00:22:57,919 --> 00:22:55,450
hundred years of extensive Studies and

435
00:23:02,899 --> 00:22:57,929
extensive usage of those systems the

436
00:23:05,130 --> 00:23:02,909
magic they doing is still not explained

437
00:23:07,919 --> 00:23:05,140
I'm not sure if I answered your question

438
00:23:11,720 --> 00:23:07,929

I mean even chemists they can't explain

439
00:23:16,019 --> 00:23:11,730
it they know they can't explain it fully

440
00:23:17,279 --> 00:23:16,029
this is rich you'd mention the noble

441
00:23:19,680 --> 00:23:17,289
gases have different characteristics

442
00:23:22,680 --> 00:23:19,690
have you used other noble gases than the

443
00:23:25,350 --> 00:23:22,690
ones you've displayed for this

444
00:23:28,919 --> 00:23:25,360
particular experiment we used only

445
00:23:31,649 --> 00:23:28,929
helium and argon as noble gases and we

446
00:23:33,389 --> 00:23:31,659
compared the results to the hydrogen and

447
00:23:35,310 --> 00:23:33,399
deuterium pressurization and the thing

448
00:23:38,659 --> 00:23:35,320
is between hydrogen deuterium and helium

449
00:23:41,549 --> 00:23:38,669
the thermal conductivity is the same

450
00:23:43,350 --> 00:23:41,559
virtually so in the baseline shift I

451
00:23:45,600 --> 00:23:43,360
showed was the same for those three

452
00:23:48,510 --> 00:23:45,610
gases so I would I would expect if I use

453
00:23:51,659 --> 00:23:48,520
let's say xenon was the thermal

454
00:23:53,370 --> 00:23:51,669
conductivity like none because it's the

455
00:23:54,370 --> 00:23:53,380
biggest well not the biggest Krypton is

456
00:23:56,529 --> 00:23:54,380
biggest so

457
00:23:59,529 --> 00:23:56,539
shift will be absolutely minimum so

458
00:24:02,950 --> 00:23:59,539
that's why since cold fusion works with

459
00:24:06,460 --> 00:24:02,960
deuterium and hydrogen for this

460
00:24:08,590 --> 00:24:06,470
application it's not just some inert gas

461
00:24:11,140 --> 00:24:08,600
they need to test their systems with

462
00:24:12,490 --> 00:24:11,150
they need to test it with helium which

463
00:24:15,850 --> 00:24:12,500

has the thermal conduct

464
00:24:17,760 --> 00:24:15,860
conduction coefficient D closest to the