

Passell, T.O. *Pd-110/Pd108 Ratios and Trace Element Changes in Particulate Palladium Exposed to Deuterium Gas*, PowerPoint slides. in *Tenth International Conference on Cold Fusion*. 2003. Cambridge, MA: LENR-CANR.org.

Slide 1

Pd 110/108 and Trace Element Changes in Pd Powder Exposed to Deuterium Gas

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Neutron Activation Analysis (NAA)

- Method uses Integral Photopeak Ratios of Gamma Rays of Neutron Capture Isotopes
- Pd110/Pd108 Possible using 342 keV gamma of 7.45 day Ag-111 and 88 keV gamma of 13.47 hour Pd-109
- Ag-109, Co-59, Zn-64, Ir-191, and Au-197 all Accessible to this method

Time of Flight Secondary Ion Mass Spectrometry (TOF-SIMS)

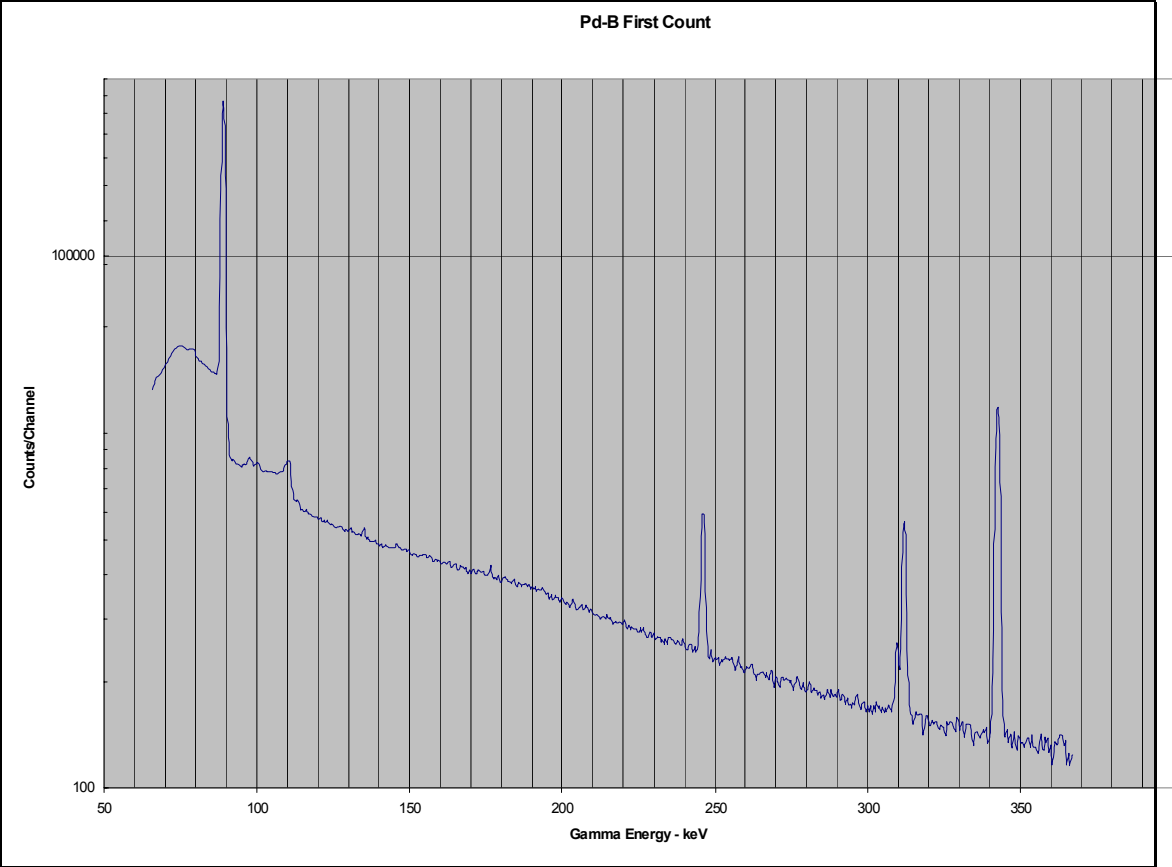
- Characterizes tiny spots on Surfaces and Layers just under the surface
- Subject to uncertainties from Multiple Atom Ions Except in the Case of Lithium
- Li-7/Li-6 Ratios Immune from Multiple Atom Ion Effects
- Results of the Analysis of Li-7/6 Ratios Included to complement NAA

• Sample	Pd110/Pd108	Ag109/Pd110
• Name	Atomic Ratio	Atomic Ratio
•	(One Sigma)	(X 10 ⁶)
•		
• Pd-D	Exactly 1	53
• (Virgin)	By Definition	
•		
• Pd-A	1.037(.008)	663
• (Active)		A/D=12.5
•		
• Pd-B	1.089(.008)	152
• (Active)		B/D=2.87
•		
• Pd-C	1.014(.009)	488
• (Active)		C/D=9.21

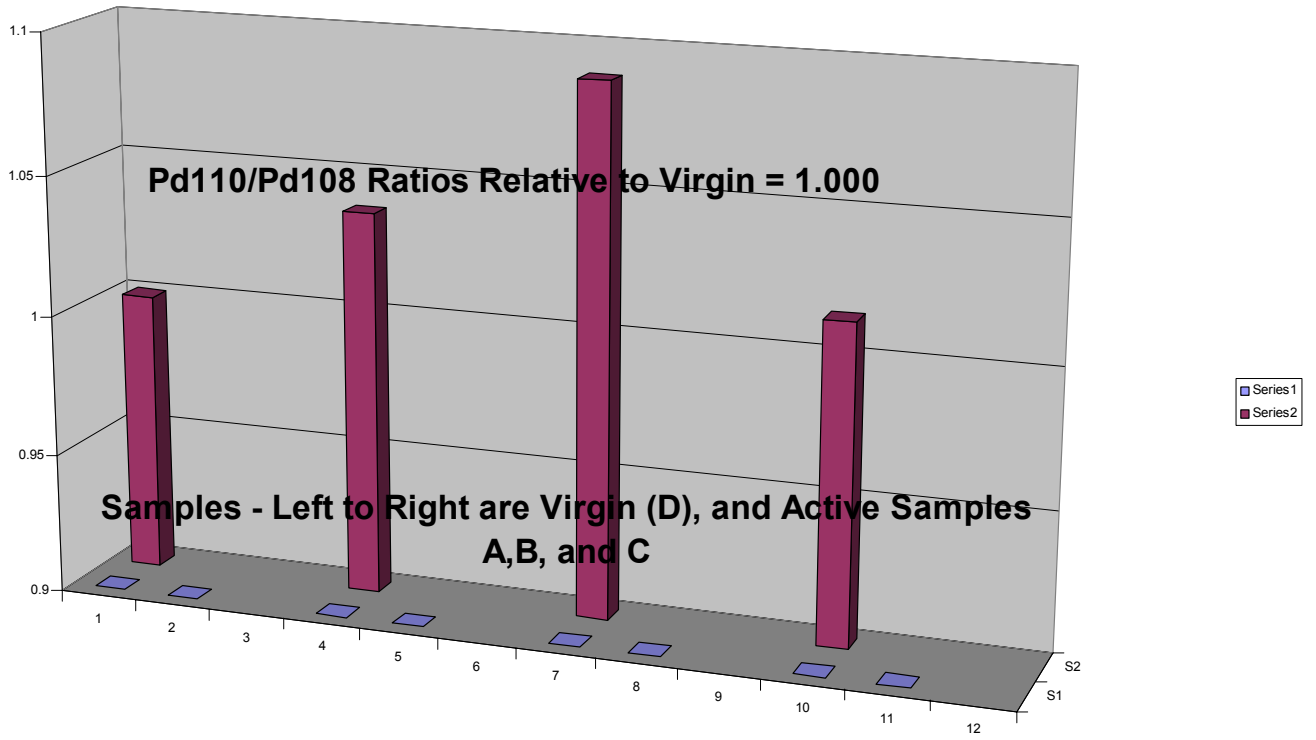
• Sample Name	Co59/Pd110 Atomic Ratio (X 10 ⁶)	Zn64/Pd110 Atomic Ratio (X10 ⁶)
• Pd-D (Virgin)	227.5	83
• Pd-A (Active)	286 A/D=1.26	516 A/D=6.22
• Pd-B (Active)	377.5 B/D=1.66	1259 B/D=15.2
• Pd-C (Active)	730 C/D=3.21	608 C/D=7.33

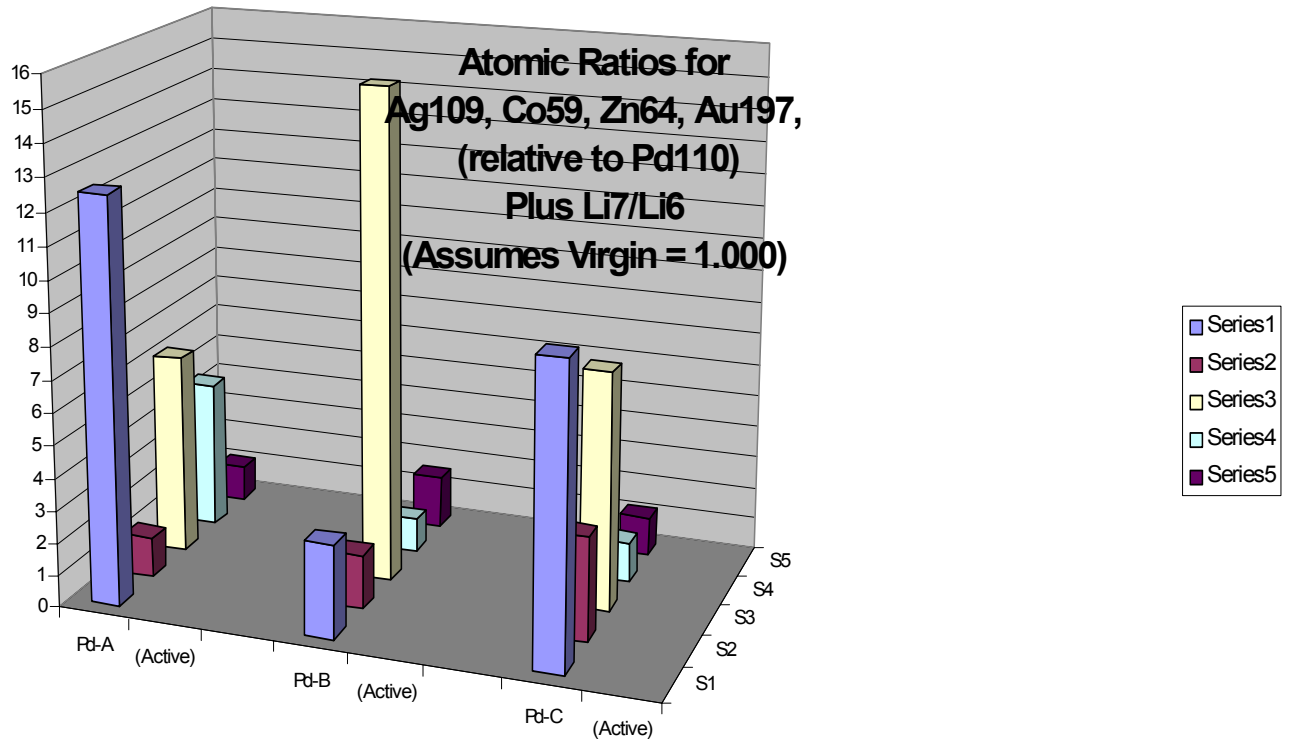
• Sample Name	Au197/Pd110 Atomic Ratio (X10 ⁶)	Li7/Li6 Atomic Ratio (One Sigma)
• Pd-D (Virgin)	19.4	13.6(1.0) Natural Li=12.5
• Pd-A (Active)	89.4 A/D=4.61	14.5(0.3) A/D=1.07(.08)
• Pd-B (Active)	20.6 B/D=1.06	22(1.4) B/D=1.62(.16)
• Pd-C (Active)	24.1 C/D=1.24	16.2(0.1) C/D=1.19(.09)

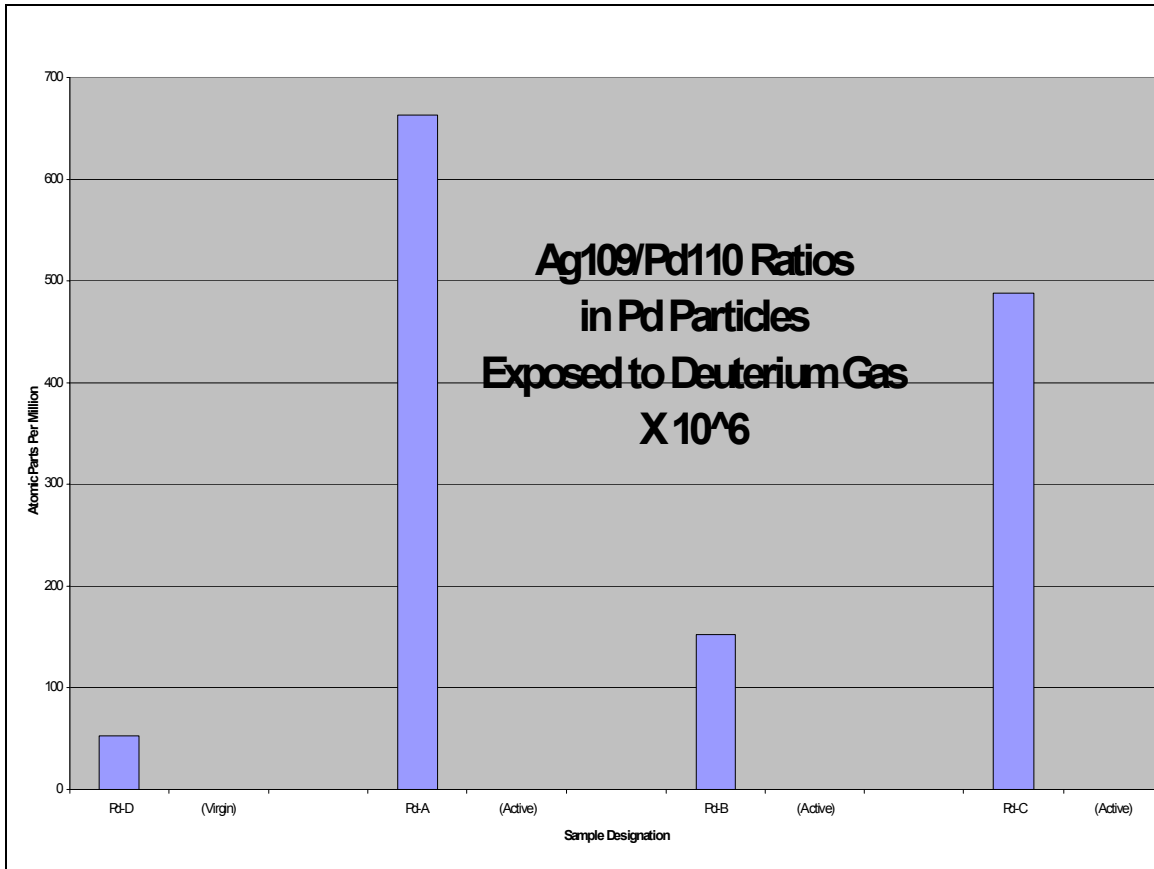
• Sample	Ir191/Pd110
• Name	Atomic Ratio
•	(X10 ⁶)
•	
• Pd-D	2.26
• (Virgin)	
•	
• Pd-A	17.8
• (Active)	A/D=7.88
•	
• Pd-B	0.84
• (Active)	B/D=0.37
•	
• Pd-C	1.5
• (Active)	C/D=0.66

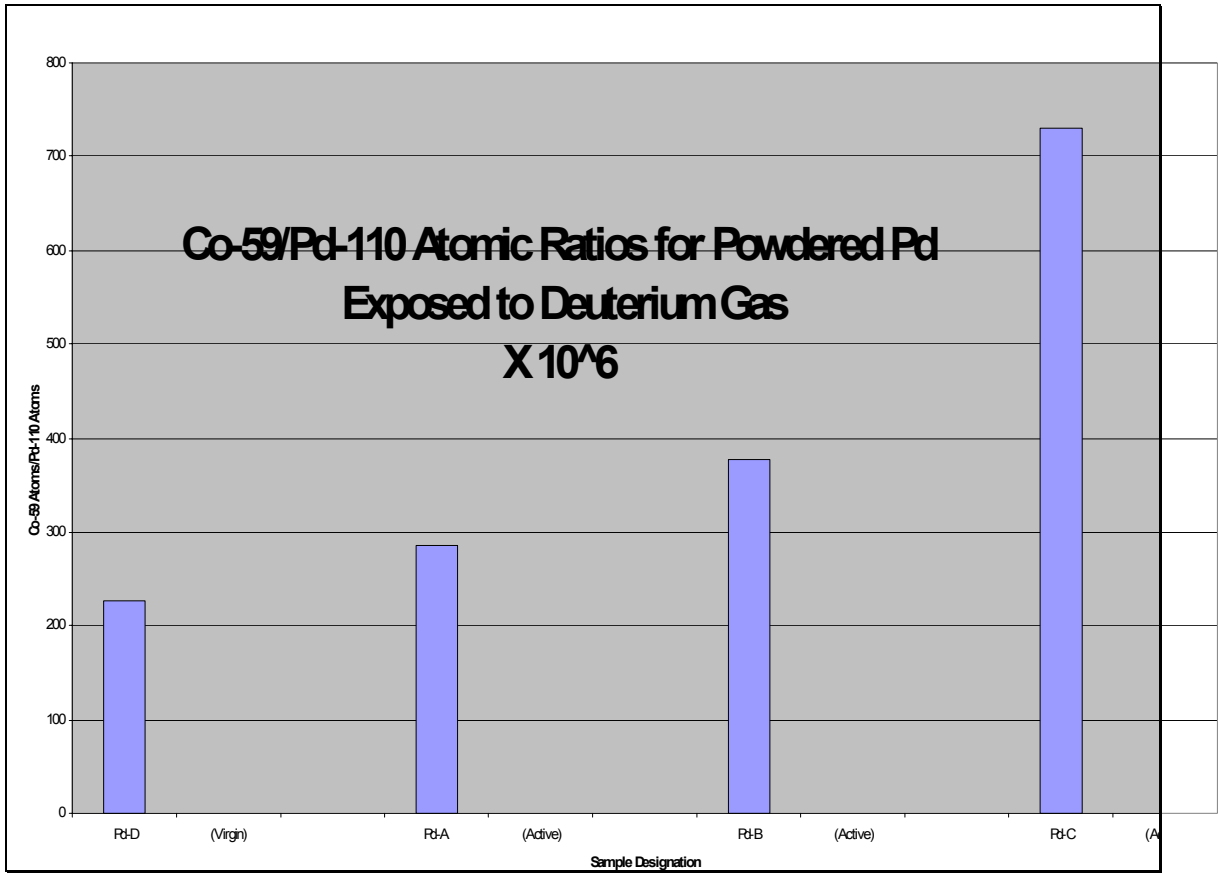


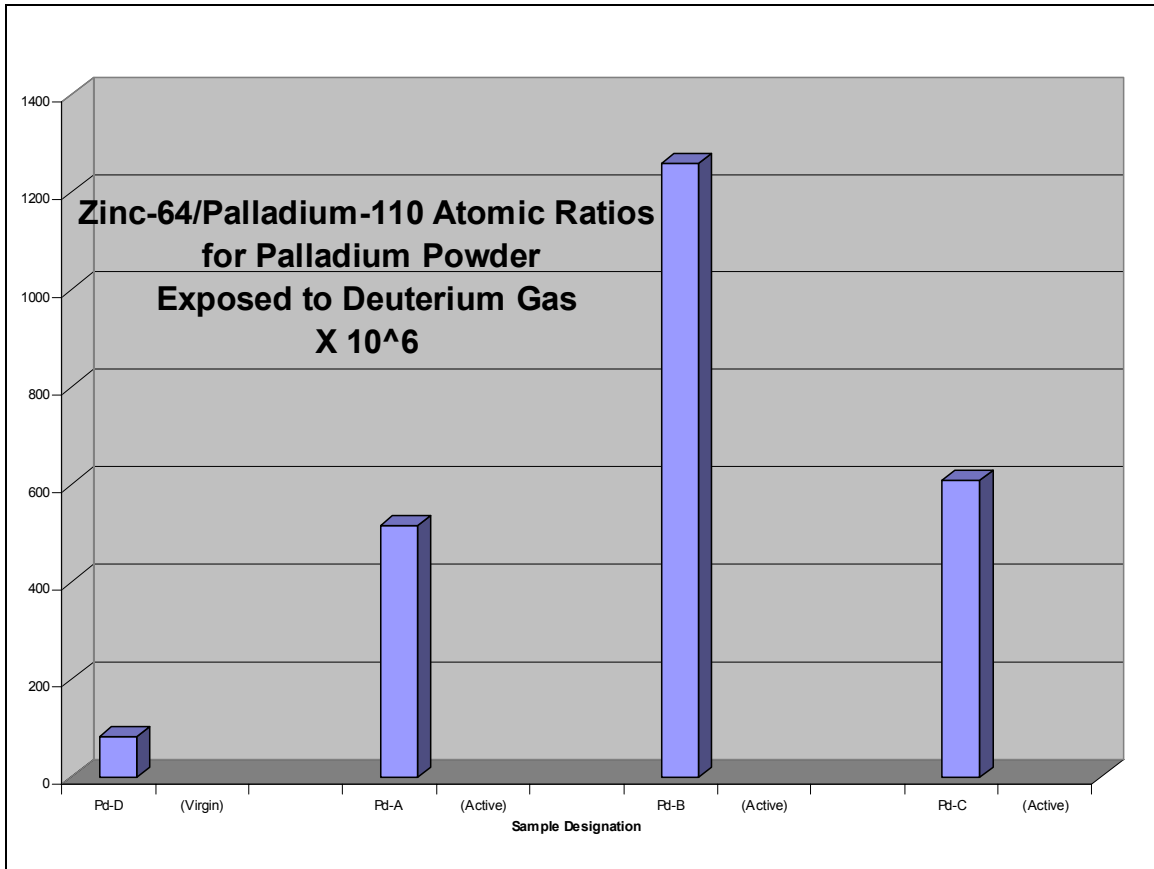
Slide 9

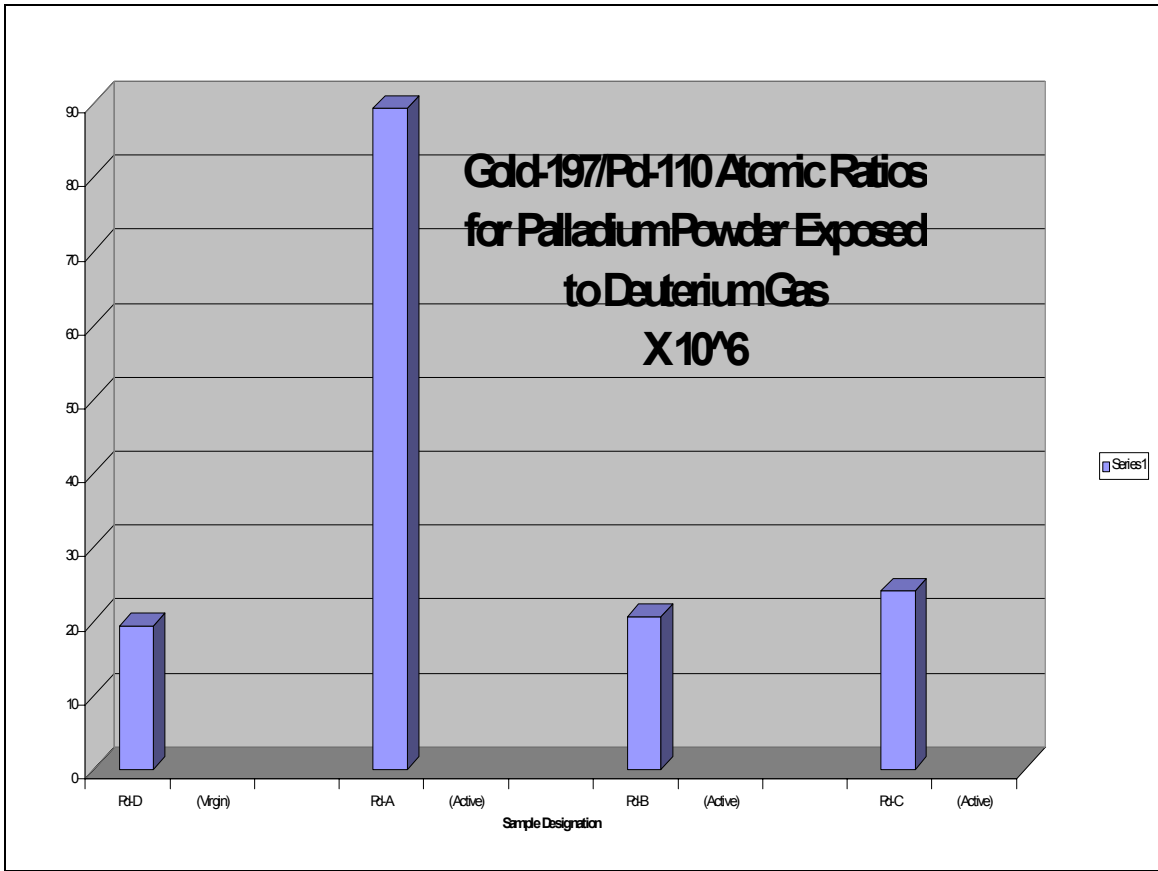


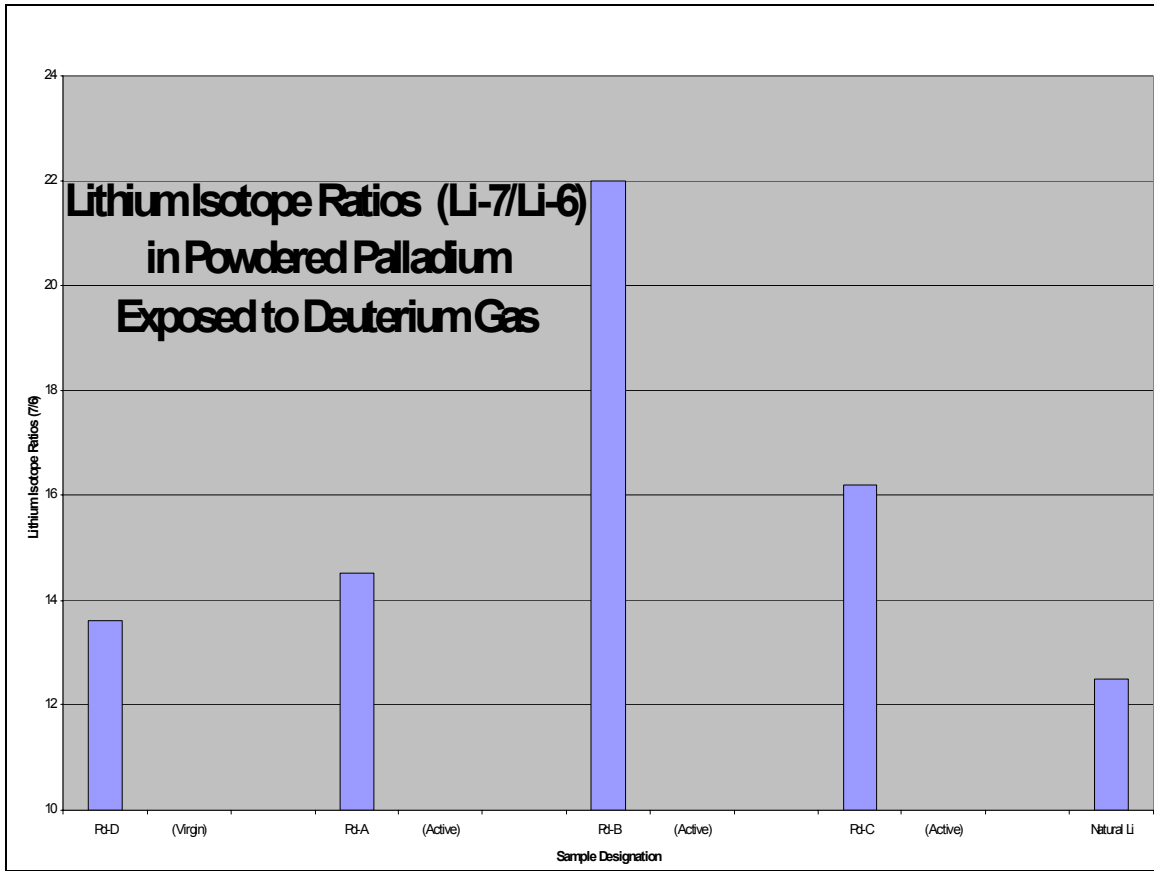


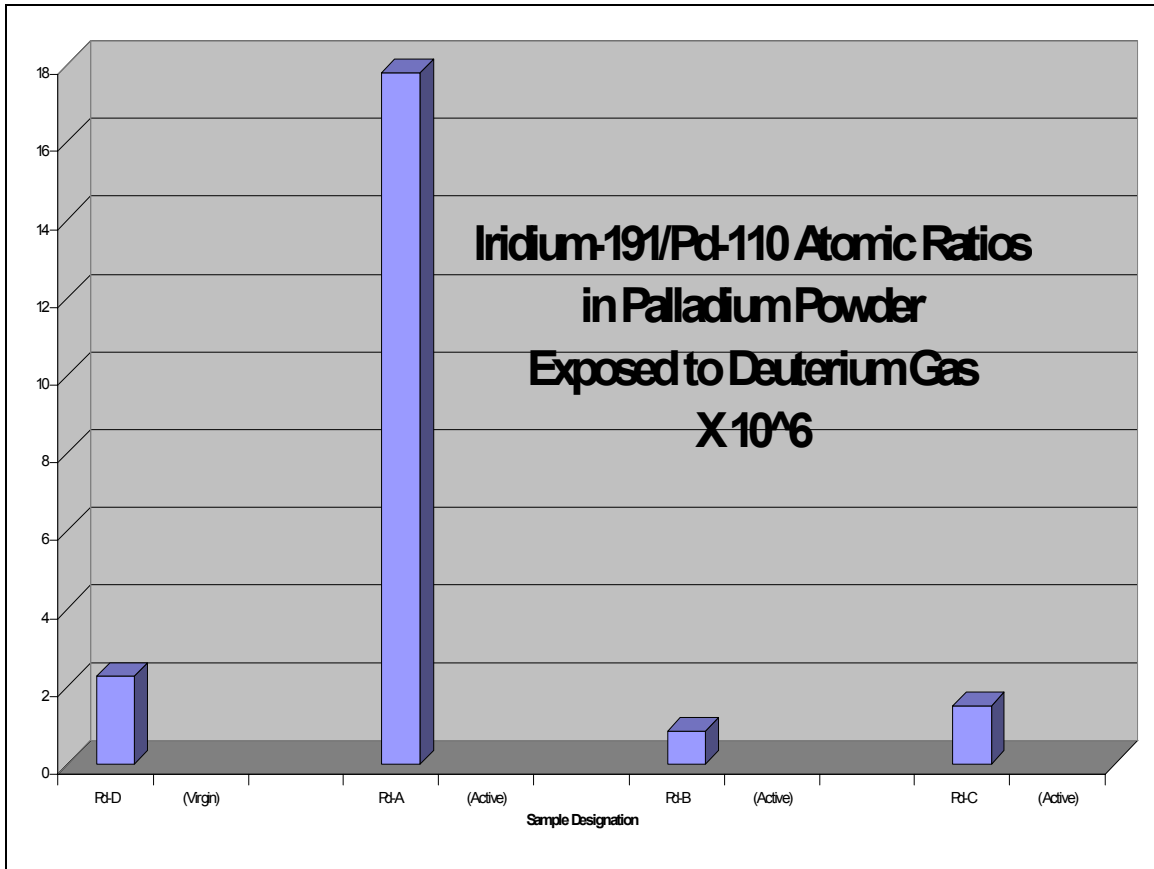












Conclusions

- Impurity Variations May be Random Fluctuations or Due to Changes from Closure of Hollow Cylindrical Chamber Containing the Powdered Palladium by Electron Beam Welding
- If Due to Some Nuclear Process, The Isotopic Ratios Should Differ From Terrestrial Values – For Elements with 2 or more Isotopes
- Lithium 7/6 Ratios Show Differences On Surface
- Silver 109/107 Being Measured For Pd-A and Pd-D by Accelerator Mass Spectroscopy (Immune From Multiple Atom Ion Confusion)

Conclusions (continued)

- Only Nuclear Sources for Producing Li-7 with Positive Q with Deuterons are
- Li-6(d,p)Li-7 , (Q=+5.03 Mev)
- Be-9(d,Alpha)Li-7 (Q=+7.06 Mev)
- Silver, Cobalt and Zinc Could Come From Deuterons on Palladium –(d,n) or (d,fission)
- Gold Could Come From Deuterons on Impurity Platinum (Pt-196(d,n)Au-197 Q=3.44 Mev)
- Two Cases of Iridium Depletion could be Fission