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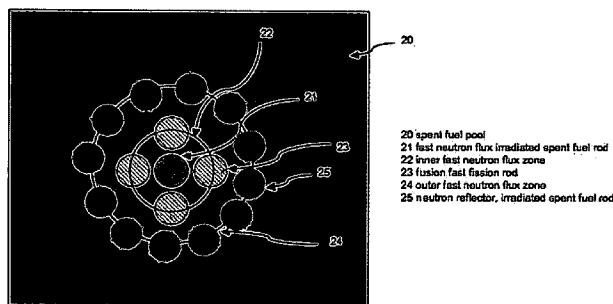
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(54) Title: A HYBRID FUSION FAST FISSION REACTOR



**Remediation Reactor
Fuel Rod Assemblies
Vertical View**

Figure 6

(57) Abstract: A hybrid nuclear fusion fast fission reactor is disclosed. The hybrid reactor may include an electrolyte solution comprised of PdCl₂ a conductive salt and D₂O, an anode of a noble metal, a cathode consisting of a conductive high Z (atomic number greater than 46) material wound around a deuteride-forming actinide nuclear fuel element, a power source providing constant current to the + anode and the - cathode, an applied power profile for fabricating the PdD nanoalloy, and a co-deposition of a PdD nanoalloy on to the high Z cathode winding as well as the nuclear fuel element. A preferred embodiment stabilizes the actinide deuteride nuclear fuel element from hydrogen isotope de-loading. A preferred embodiment initiates deuterium-deuterium fusion in the deuterized fuel element and fissioning deuterized fuel element actinides. A preferred embodiment includes surrounding spent nuclear fuel elements with deuteride nuclear fuel elements that will fast fission the spent fuel elements. Another preferred embodiment includes surrounding the deuteride nuclear fuel elements with spent fuel elements as fast neutron reflectors that will also fission.

INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - G21B 1/00 (2009.01)

USPC - 376/100

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
USPC - 376/100, 308, 327Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC - 376/100, 308, 327

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PubWEST(USPT,PGPB,EPAB,JPAB); Google, Google Patent, Google Scholar

Search Terms Used: fusion, cathode, spent fuel, nuclear, waste, deuterim, deuterium-deuterium, fusion, fission, hydrid, electrolyte, deuterade, deuteride, fast, deloading, amalgam, PdCl2, electrolyte.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	TAKAHASHI, A. et al. Excess heat and nuclear products by D2O/Pd electrolysis and multibody fusion, 1992, Electromagn. Mater., Vol. 3: p. 221-1 - 221-13, abstract, page 221-2 para 2, page 221-13 para 1.	2, 4 - 12
Y	SAHIN, S. et al. LWR spent fuel transmutation in a high power density fusion reactor, 2004, Annals of Nuclear Energy, Vol. 31, pp 871 - 890, abstract, page 872 para 1, page 873 para 3, page 874 para 3, page 880 para 1,2.	1 - 12
Y	SPALLONE, A. et al. An Overview Of Experimental Studies On H/Pd Over-Loading With Thin Pd Wires And Different Electrolytic Solutions. 2004, in Eleventh International Conference on Condensed Matter Nuclear Science, Marseille, France, pp 1-9, page 2 para 8.	6 - 11
Y	MOSIER-BOSS, P.A. et al. Use of CR-39 in Pd/D co-deposition experiments, 2007, Eur. Phys. J. Appl. Phys. Vol. 40, pp 293-303, page 294 col 1 para 1, col 2 para 2, page 298 col 2 para 1,2, Fig. 2.	1 - 3
Y	SZPAK, S. et al. On the behavior of the cathodically polarized Pd/D system: Search for emanating radiation, 1996, Physics Letters A, Vol. 210, pp. 382-390, page 394 col 2 para 2,3.	1 - 3
Y	CHUBB, S.R. Why Particular Nano-Scale PdD Crystals Turn-on Faster, 12th International Conference on Condensed Matter Nuclear Science, Abstracts, 2005, Yokohama, Japan, [retrieved on 2009-08-12], Retrieved from the Internet: <URL:http://www.iscmns.org/iccf12/ICCF12-Abstracts.pdf>	1 - 3
Y	BLANOVSKY, A. A System for Nuclear Waste Transmutation Driven by Target-Distributed Accelerators, 2004, arXiv:physics/0401010v1 [physics.acc-ph] [retrieved on 2009-08-12], Retrieved from the Internet: <URL:http://arxiv.org/abs/physics/0401010v1>	10, 11

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