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Engineered micro-nano-hetero-structures susceptible of revolutionizing nuclear energy

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Statement of the Problem: The actual nuclear power production relies on replacing a chemical burner, using coal, oil, methane gas with a nuclear heat source, mainly based on a "hot-rod" technology, developed by 1950s, that has many issues making it less attractive as a power production method. Novel 2D and 3D engineered nano materials have embedded heterogeneity by design, and they are able to bring in harmony constructive materials with the nuclear process taking place inside them, rendering exceptional properties. It is well-known from Damascus swords that the materials ultimate determine the properties of the devices made with them and these 6 families of nano-nuclear materials are prone to produce a revolution in nuclear energy, known as one of the most conservative guild. Prof. Harari once famously said "the electric light does not came from continuous enhancements in candles' technology", which it seems to be true for nuclear power too, that now is in accelerated decay, and people of the guild are talking about its renaissance ignoring that have to solve its problems first. The development of these materials started 40 years ago, having a spiral evolution from nuclear reactions, in fm scale realm, to nano-scale, mezzo–scale and applications now being in TRL=3.. They micro-hetero-structures for self-separation and partitioning of fission products, nano-hetero structures resembling a super-capacitor charged by nuclear energy and directly discharged as electricity, nano-beaded structures for advanced separation of nuclear-transmutation products using nano-clusters special properties, micro-fractal materials with radiation damage self-repairing capabilities, nano-structures for radiation guiding with electronic path-control, for super-light radiation shielding and nuclear reactor control, and advanced structures for generating active nuclear quantum environments to control the nuclear reaction intrinsic parameters and advanced research in quantum entanglement and teleportation. The development of these materials will make possible the commissioning of advanced generations of nuclear related devices.

Recent Publications:

1. L.C. Brown, Direct Energy Conversion Fission Reactor. Annual Report To The U.S. Department Of Energy, 2000. GA–A23593.
2. Popa-Simil Liviu, Accelerator Enabled Nano-Nuclear Materials Development. AdvNanoEnergy, 2017. 1(1): p. 1-12.LiX, SchwachaMG, ChaudryIH, ChoudhryMA (2008)Acutealcohol intoxication potentiates neutrophil-mediated intestinal tissue damage after burn injury. Shock 29:377.
3. Sekimoto H., 'CANDLE' burnup regime after LWR regime. Progress in Nuclear Energy, 2008. 50(2-6): p. 109-113.

4. L. Popa-Simil, Micro and nano flow usage in future nuclear reactors. Nanotech 2007, 2007. 3(4): p. 395 - 398.
5. Popa-Simil L., Novel nano-engineered materials boosts the fuel cycle and nuclear power applications. Actinide and Fission Product Partitioning and Transmutation, 2017. Nuclear Sciences, NEA/NSC(R3): p. 331.

Biography

Liviu Popa-Simil, is the Executive Director of LAAS - Los Alamos Academy of Sciences, which strives to serve the public good by promoting science and innovation and the president of LAVM LLC, a private company developing nano-nuclear materials and THz applications as security systems.He is a nuclear engineer physicist, graduating from the Nuclear Engineering Faculty in Bucharest, Romania, specialized in Fast Breeder Reactors Physics and Engineering, and with dissertation work in Laser-Plasma Jet Nuclear Materials Enrichments.Since 2002, he has worked for Los Alamos National Laboratory, developing Real Time Radiography methods, and then, developed advanced nuclear fuel cycle as part of AFCI program, previously being a senior researcher, program manager at NIPNE-HH, in Bucharest Romania, specialized in accelerator applications and nuclear materials. He authored books on Kindle e-Book and iTunes on nano-nuclear materials, strategic space applications, climate change, transportation, supercomputers, etc., and he has filed patents on resistive spot welding, nuclear materials, THz imaging, ballistics, medical devices, etc. He has also contributed more than 300 peer-reviewed articles to professional journals, wrote chapters for several books on novel nuclear materials, super-computers, etc. and speaks at approximately three to four conferences per year. He gave more than 500 talks, several keynote speeches, many invited talks, and hundreds of seminaries and presentations.