Infusible Nuclear Fuel Synthesis beyond 25,000 °C for Far Deep Cosmic-Space Explorations

B Udovic[1]
[1]*Slovenia*
boris.udovic@gmail.com

Every carbon-allotrope sample is suitable to be directly and clearly atomized into overheated free carbon atoms which are promoted and shifted towards highly excited electronic states. However, the ubiquitous extended practices to construct great-sized (low density ↔ colder plasma) generators allow the achievement of operative temperatures which are struggling too low for the always desirable finest and efficient atomization targets. All the attempts to strip-out denuded atoms are unavoidably linked to many cumbersome working-parameters needed for high chemical synthesis demands but the energy availability to do this is always too low. The straightforward pyramidalization processes of Gillespie-governed tetrahedral carbon atoms largely evade and surpass the often encountered carbo-graphitization reactions – but at extremely high temperatures only. In addition, the 2D-stacked graphite with its unfilled structural space-gaps and weakly interacting van der Waals forces constitutes the well known matrix for nuclear carbo-moderators – however, this cheap material unavoidably affects its thermal conductivity inside the fissionable fuel-pellets. On the other hand the isotropically distributed and spidery interlinked tetrahedral amorphous (ta-C) carbon atoms work better: their uninterrupted chains of momentum transfers minimize the elastic vibration dispersions. The synthetic non-stoichiometric 3D carbo-actinide fuel remains porous, permeable for rapid out-gassing of hot gases-debris as the massive isotope 135Xe, the most powerful known neutron poison, which rises up from radionuclide fissions and blocks the fission chain reactions. These exotics disclose new pathway-synthesis possibilities which are far out from everyday practices. The Bosonic properties of microwave photons inside the rectangular wave-guide resonators allows to achieve cumulative actions by highly localized electromagnetic (E.M.) peak-effects via oriented-fields convolution into a specific space-tine point. Volatile actinide/trans-actinide halide compounds (MX3, X = Br, etc.) are rapidly co-evaporated together with sharply and blistery gasified carbon species. At high temperatures they are thrust into a narrow quartz tube which passes orthogonally and throughout the drilled borehole into the flat walls of a rectangular waveguide resonator - 3D optimized cavity-coupler tuned up to 5.8 GHz. Here, the (E.M.) energy density and the peak-effects are maximized. The inlet low-temperature plasma is quickly shifted into high (E.M.) fields-zone to become more and more ionized by powerfully accelerated free electrons - even beyond 25,000 °C. The excited carbon atoms are expanded hypersonically into a vacuum trap to lose their high momenta via inelastic collisions against the chamber walls. The rapid phononic thermalization processes through dendritic (ta-C) carbon chains promote the growth of a spidery-amorphous but porous metal-carbide fuel-matrix – suitable for high powering in deep cosmic space mining and explorations.