strengthener layers of metal nanoparticles for icf Targets

I.V. Akimova, A.A. Akunets, N.G. Borisenko, A.I. Gromov, Yu.A. Меrkuliev, S.M. Tolokonnikov

P.N.Lebedev Physical Institute of the Russian Academy of Sceenses.Russia.Moscow( LPI) [tolokon@bk.ru](mailto:tolokon@bk.ru)

The layers of ultrafine powders of metals effective for a number of jnteresting results and useful for applications as laser fusion targets.

The idea of hardening and change of parameters of layers of ultradispersive metal powders by a thermal method proposed by Prof Yu.A.Merkuliev in 2013 and conducted a series of experiments on the manufacture and control of such layers, unfortunately interrupted by his death. Now these work resume [ 1,2,3].

Ultradispersed powders of metal begin to fuse at~1/3 or less of the melting points of thematerial( depending on material and initial density and particle size of the UDP). This allowed to conduct experiments on the hardening of the UDP of Au, even without the use of vacuum oven.

Note that the material begins to air raft in the depth of the subsidence and partial agglomeration of particles, where in layer is substantially hardened. In a vacuum furnace is more uniform alloying and hardening of the material throughout the volume.

The our samples controlled by optical and x-ray, and scanning electron microscopy [3,4].

A number of difficulties connected with the work at elevated (up to 5000 C) temperatures, small-size samples and small amounts of UFP metal used have been overcome.

The work was supported in part by the RFBR ( Grant № 15-02-08113).

References

1. N.G. Borisenko, A.E Bugrov, I.N. Burdonskiy, I.K. Fasakhov, V.V.Gavrilov, A.Yu. Goltsov, A.I. Gromov, A.M. Khalenkov, N.G. Kovalskii, S.F. Medovchshikov, Yu.A. Merkuliev, V.M. Petryakov, M.V. Putilin, G.M. Yankovskii, and E.V Zhuzhukalo. Physical processes in laser interaction with porous low-density materials. // Laser and Particle Beams, 2008, V. 26, 04, pp. 537-543.
2. I.V. Akimova, N.G.Boriserko, A.I. Gromov, Yu, A. Merkuliev, A.S. Orekhov. Fabrication of effective low-density converter of intensive laser radiation to x-ray and novel measurement method of laser density from heavy metal nanoparticles. // Problems of atomic science and technology. Series.Thermonuclear fusion. Issue 2.2012. pp 122-130.
3. L.A.Borisenko, I.V. Akimova, A.A.Akunets, A.I. Gromov, A.S. Orekhov. Metal produced as nano-snow layers for converters of laser light into X-ray for indirect targets as intensive EUV sourses// Journal of Radioanalytical and Nuclear Chemistry. 2014. Vol 299. Num 2. pp 955-960.
4. A.S. Orekhov , A.A.Akunets, L.A.Borisenko, N.G..Borisenko, A.I. Gromov, Yu.A. Merkuliev, V.G.Pimenov, E.E. Sheveleva, V.G. Vasiliev. Modern trends in low-density materials for fusion. Journal of Physics: Conference Series, 2016 ,688 (1) 012080.