

FEATURES OF SINTERING OF COARSE-GRAINED POWDERS OF TUNGSTEN

Andreyev I.V., Bondarenko V.P., Tarasenko L.G.

Bakul Institute for Superhard materials National Academy of Sciences of Ukraine
04074, 2 Avtozavodska, Kyiv, Ukraine, e-mail: aigor@i.ua

Tungsten and alloys on its basis thanks to the unique characteristics, finds more and more wide application in many branches of industrial production. One of actual scopes of tungsten materials is thermonuclear energy where tungsten is perspective for protection against plasma of details of divertor [1] as its operational firmness in 20 times exceeds firmness of iron, copper, beryllium and in 10 times - molybdenum. Thus the most actual is creation of porous tungsten materials through which should diffusion the fused lithium. For regulation of porosity of such materials it is necessary to use powders of tungsten of different dispersion.

At Bakul institute for superhard materials scientific bases and technological aspects of [2] receptions of powders of tungsten with the size of grains to 1000 microns which can be used as initial components for reception with the set porosity are developed.

Revealing of influence of the sizes of particles of tungsten on their caking at use as the activator hydrogen-water steam the gas environment was the purpose of the present work. The powders of the tungsten received in the closed reactor, have been divided into fractions 3-5, 5-100, 40-100, 300-500, 500-1000 and more 1000 microns. From the specified fractions samples $\varnothing 9 \times 9$ mm are pressed. Thus powders have been preliminary involved with softener for improvement of pressed. Sintering spent in the environment of hydrogen at temperature 1200 °C in classical flowing system and in the closed reactor. At sintering in the closed reactor after removal from samples of softener water for creation hydrogen-water steam the gas environment has been entered.

Results of experiment are presented on fig. 1. The size of particles of pressings increases from left to right.

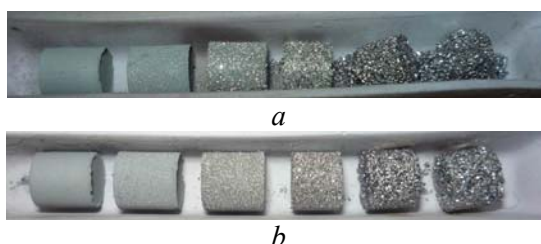


Fig. 1 Samples, sintered in flowing (*a*) and closed (*b*) a reactor

Apparently from fig. 1 *b*, application hydrogen-water steam the gas environment has allowed sintered samples even from particles of tungsten more than 1000 microns. Such effect is caused by formation in the course of sintering gaseous tungsten based substance of type $WO_2(OH)_2$ [3] which, reduction to tungsten in places of contact of particles, has allowed to provide between them physical contact. During too time, from fig. 1, *a* it is visible, that the most coarse-grained pressings have not kept the form after removal of softener and have collapsed.

Thus, application of steams of water allows activating process of sintering of powders of tungsten, providing the size of a time of a material over a wide range.

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