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# QUALIFICATION OF METHODS FOR APPLYING COATINGS OF VARIOUS FUNCTIONAL PURPOSES ON ITER BLANKET COMPONENTS *)

[4]Cheburova A.V., [4]Kozlov S.A., [4]Khomiakov S.E., [4]Poddubnyi I.I., [4]Sviridenko M.N., [1]Belikov A.I., [1]Kolesnik L.L., [2]Sher E.S., [2]Ulyanitskiy V.V., [3]Putrik A.B.

[1]*Electrovacuum Technologies LLC, Moscow, Russia*
[2]*STPC LLC, Novosibirsk, Russia*
[3]*"ITER-Center" Private Institution, Moscow, Russia*
[4]*NIKIET JSC, Moscow, Russia*

As part of the implementation of agreements on the supply of in-vessel components to the ITER site, NIKIET JSC, with the support of the representatives of Russian small businesses, carries out activities on the manufacture of the supplied ITER components including the application of coatings of various functional purposes. This paper describes two coating technologies that have been qualified by the ITER International Organization (ITER IO): the electrical insulating coating (EIC) and the low-friction coating (LFC).

The electrical insulating coating (EIC) is designed to provide electrical insulation of the ITER blanket module connectors elements. The detonation method developed by Sibenan Technologies of Protective Coatings LLC is used to deposit the EIC, and aluminum oxide (A1203) with the NiCr adhesive sublayer is used as the EIC material. To verify EIC quality and performance, qualification tests were carried out, including the thickness measurements of the sublayer and the coating, volume resistivity measurements, tests to check the strength of EIC adhesion to the substrate material, EIC porosity measurements, and analysis of EIC chemical composition. All of the above tests were carried out in accordance with the procedures approved by ITER IO for checking compliance of the deposited EIC with the established acceptance criteria.

The low-friction coating (LFC) is designed to reduce the friction coefficient to meet the requirements for the tightening force of in-vessel components threaded elements. Molybdenum disulfide (MoS2) deposited by vacuum magnetron sputtering was chosen as the LFC material. The deposition technology was developed by NIKIET JSC together with Electrovacuum Technologies LLC. The LFC deposition technology has also passed all stages of qualification: measurements of the deposited coating thickness, measurements of roughness after the deposition, visual inspection of LFC, a series of tribological tests and a series of tightening/loosening tests.

This paper summarizes the qualification results for each of the above coatings, presents the test results and conclusions on further optimization of the developed technologies and their adaptation to the subsequent serial production of in-vessel blanket components with coatings of various functional purposes to be delivered to the ITER site.

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