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Impact of thin nanoengineered coatings on the stress–strain state of cylindrical cladding made from Zr-based alloys for nuclear fuel elements

ABSTRACT. A current problem concerning the use of thin nanoengineered coatings for increasing operability of nuclear fuel cladding made from widely used zirconium-based alloys is considered from the point of view of the mechanical elastic interaction between the coating and the cladding. A mathematical model of thin coatings on a cylindrical cladding is presented in the form of special boundary conditions of the equations of elasticity theory that define the stress–strain state of the cladding. It is shown that thin coatings can noticeably decrease stresses in the cladding.

Keywords: elasticity, thick solids, thin shells, strength

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