

Abstract Submitted
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Vortex Structures in the Shock-deformed Armor Steels¹ SVETLANA ATROSHENKO, YURI MESHCHERYAKOV, NAUMOVA NATALIA, Institute for Problems of Mechanical Engineering RAS, IPME RAS TEAM — Several kinds of armor steel were tested under uniaxial strain conditions within impact velocity range from 250 to 400 m/s. Using optical and REM microscopy, the post shocked specimens were studied to reveal the kinematical mechanisms of dynamic deformation at the mesoscale. In all the specimens, the cross-section of specimens was found to be filled with rotational cells of very complex space morphology. Each rotation cell consists of central core of 1-2 μm in diameter and family of petals surrounding the core, so the space configuration of eddy is closely reminds a fan of total size 6-7 μm . During the deformation, the petals move around the core providing the vortical motion of rotation as a whole. Dependence of rotational cell density on the strain rate changes non-monotonously, maximum density corresponds to maximum macrohardness and maximum of spall-strength of steel.

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