Abstract Submitted
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Novel Transrotational Solid State Order Discovered by TEM in Crystallizing Amorphous Films[1] VLADIMIR KOLOSOV, Ural Federal University — Exotic thin crystals with unexpected **transrotational** microstructures [1] have been discovered by transmission electron microscopy (TEM) for crystal growth in thin (10-100 nm) amorphous films of different chemical nature (oxides, chalcogenides, metals and alloys) prepared by various methods. Primarily we use our TEM bend contour technique. The unusual phenomenon can be traced ***in situ*** in TEM column: dislocation independent regular internal bending of crystal lattice planes in a growing crystal. Such **transrotation** (unit cell **trans**lation is complicated by small **rotation** realized round an axis lying in the film plane) can result in strong regular lattice orientation gradients (up to 300 degrees per micrometer) of different geometries: cylindrical, ellipsoidal, toroidal, saddle, etc. Transrotation is increasing as the film gets thinner. Transrotational crystal resembles ideal single crystal enclosed in a curved space. Transrotational micro crystals have been eventually recognized by other authors in some vital thin film materials, i.e. PCMs for memory, silicides, SrTiO3. Atomic model and possible mechanisms of the phenomenon are discussed. New transrotational nanocrystalline model of amorphous state is also proposed. [1] V.Yu. Kolosov and A.R.Tholen, Acta Mater., 48 (2000) 1829.

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