

Abstract Submitted
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Eshelby Twist and Magic Helical Zinc Oxide Nanowires and Nanotubes TRAIAN DUMITRICA, EVGENIYA AKATYEVA, University of Minnesota — Twisted zinc oxide nanowires and nanotubes were recently synthesized by screw-dislocation growth. We show theoretically that once their diameter increases above a critical size of the order of a few atomic spacings, the existence of these structures can be rationalized in terms of the energetics of surfaces and veritable Eshelby's twist linear elasticity mechanics supplemented by a nonlinear core term. For Burgers vector larger than the minimum allowed one, a twisted nanotube with well-defined thickness, rather than a nanowire, is the most stable nanostructure. Results are assistive for designing ultrathin nanostructures made out of nonlayered materials [1].

[1] E. Akatyeva and T. Dumitrica, Phys. Rev. Lett. 109, 035501 (2012).

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