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**Misfit stresses and their relaxation by misfit dislocation loops in core-shell nanoparticles with truncated spherical cores.** (English) Zbl 1475.74022  
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Summary: For the first time, we suggest a theoretical model, which describes the misfit stress relaxation in spherical core-shell nanoparticles with axisymmetric truncated spherical cores through the formation of circular prismatic loops of misfit dislocations at the core-shell interface. The special case of a semispherical core with base in the equatorial plane of the nanoparticle is considered and analyzed in detail. It is shown that the formation of misfit dislocation is energetically favorable when the misfit strain reaches its critical value, which depends on the system parameters. When forming, the misfit dislocation occupies in most cases its optimal position at the distance about of 1/4 of the core radius from the core base. Nanoparticles with cores of radius about of 3/4 of the shell radius are the less stable to generation of misfit dislocation loops.

**MSC:**

[74E30](#) Composite and mixture properties

[74M25](#) Micromechanics of solids

[74-10](#) Mathematical modeling or simulation for problems pertaining to mechanics of deformable solids

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**Keywords:**

[circular prismatic loop](#); [truncated spherical core](#); [misfit strain](#); [misfit dislocation](#); [inclusion](#); [analytical model](#)

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