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A Brief Review on Theoretical Models of Deformation Twinning at Locally Distorted Grain Boundaries

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Abstract. A brief review of the theoretical models which describe mechanisms of deformation twinning in nanocrystalline and ultrafine-grained materials is presented. In the framework of the models, formation of nanoscale deformation twins occurs at locally distorted grain boundaries that contain fragments being rich with grain boundary dislocations due to preceding severe plastic deformation processes. Within the review, mechanisms of deformation twinning at locally distorted grain boundaries represent (a) the consequent emission of partial dislocation; (b) the cooperative emission of partial dislocations; and (c) the generation of multiplane nanoscale shear.

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