# Atomistic Origin of High Ductility in Nanostructured Metals

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Nanostructured crystalline solids offer the great potential of producing strong and ductile materials. Recent experiments show that the introduction of nano-scale growth twins within ultrafine crystalline copper leads to an unusual combination of high strength and ductility, also manifested with an increase in the strain-rate sensitivity [1]. We explore in this work the critical role of twin boundaries in mediating the 3-D thermally activated dislocation motion, as well as the consequent influences on the rate dependence of plastic flow [2]. Using the reaction pathway analysis, we identify the atomistic pathways of dislocation cross-slip at the coherent twin boundary. The activation energies and activation volumes are quantified, thus making contact with previous continuum analyses and experimental measurements.

**References**

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