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Disappearance of plastic anisotropy in decagonal quasicrystals at small scales and room temperatureYu Zou¹, Pawel Kuczera², Walter Steurer² and Ralph Spolenak^{1,*}

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Abstract

Decagonal quasicrystals (DQCs), as a class of two-dimensional quasicrystals, are known to be highly anisotropic in most of their physical properties. Here we show that their plastic anisotropy can be considerably reduced, and even eliminated, when they are scaled down to the sub-micrometer regime and deformed at room temperature. The reduced plastic anisotropy might be attributed to both size and temperature dependence of dislocation activities. This finding may shed light on the exploration of new deformation mechanisms for quasicrystal plasticity in an unknown size and temperature regime.

Keywords: quasicrystals, plastic deformation, anisotropy, size effect, micro-compression

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