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## General Methodology to Estimate the Dislocation Density from Microhardness

### Measurements

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### Abstract

A general methodology to estimate dislocation density in cubic metals using microhardness measurements has been established. The proposed methodology is based on the Indention Size Effect (ISE) and microstructural strengthening mechanisms. The methodology was validated using published experimental data of a pure Nickel (FCC) and Tungsten (BCC), as well as our own data on dual phase (BCC and FCC) lean duplex stainless steel 2101(LDSS 2101). The estimations of dislocation densities for LDSS 2101 phases were confirmed via X-ray diffraction measurements. Our results collectively validated the proposed approach as a general method to estimate dislocation density with acceptable accuracy.

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