

ILL experimental report of experiment 1-01-42

The results proceeding from the experiment 1-01-42 proposed by Keller C., Hug E. and Chateigner D. from the university of Caen, France are available in the paper:

“On the origin of the stress decrease for nickel polycrystals with few grains across the thickness”, Material science and Engineering, [doi:10.1016/j.msea.2008.09.054](https://doi.org/10.1016/j.msea.2008.09.054)

Abstract of the article:

The mechanical behaviour under uniaxial and loading/unloading tensile tests of high purity nickel with different number of grains across the thickness is studied experimentally. The specimens have a constant 500 μm thickness and the mean number of grains across the thickness (i.e. thickness “t” to grain size “d” ratio) lies between 0.9 and 15. An extended microstructural study is operated and no change of the microstructure appears with a modification of t/d. The experimental results show that the t/d ratio affects the hardening stages, flow stress, intragranular and intergranular backstress of the samples. For specimens with few grains across the thickness, the flow stress is reduced due to a decrease in the intragranular backstress. The main explanation of these results is a delay of the generalization of cross slip for the lowest t/d ratio specimens due to surface effects.