X-Ray Diffraction Analysis of the Dislocation Structure of Cu-Nb Interfaces

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The Burgers vector population and dislocation densities are determined in strongly textured Cu-Nb multilayers by the method of X-ray line profile analysis. In a high-resolution diffractometer dedicated for line profile analysis the specimens are mounted on a crystal-goniometer. For each *hkl* reflection the samples are oriented in such a manner that always the major texture component is in reflection conditions. The strain part of line broadening is evaluated in terms of individual measured dislocation contrast factors. The Burgers vector population is evaluated by matching the measured and the theoretically calculated contrast factors. When the total specimen thickness is less than about a few micrometers, the prevailing Burgers vectors are either within the plane parallel to the interface of close to these directions. The analysis has been extended to Cu-Nb multilayers irradiated by He. First result obtained on the He implanted specimens will also be discussed.