

PEAK INTENSITY PHENOMENON DURING IN-SITU NEUTRON DIFFRACTION EXPERIMENTS ON DUCTILE RARE EARTH INTERMETALLIC YCu

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Abstract:

Recently, a family of rare earth intermetallics has been discovered which shows intrinsic room temperature ductility. A lack of clear understanding of the deformation mechanisms which lead to this ductility served as the motivation for neutron diffraction experiments. In-situ tension and compression loading experiments were conducted using SMARTS at LANSCE.

During the course of testing samples of polycrystalline YCu, a remarkable peak intensity phenomenon was discovered. With applied load EVERY Bragg peak showed a noticeable increase in intensity. Changes in peak intensity are not crystallographically dependent, but rather are shown to be a function of d-spacing. The intensity of the {110} peak shows an increase by a factor of more than 2.5.

We report on the insight these diffraction results provide into understanding sub-grain structural development during deformation.