

Magneto-Plastic Effect in Nickel Single Crystals

| | |
|------------------------------|--|
| 著者 | HAYASHI Shigeyuki, TAKAHASHI Seiki, YAMAMOTO Mikio |
| journal or publication title | Science reports of the Research Institutes, Tohoku University. Ser. A, Physics, chemistry and metallurgy |
| volume | 23 |
| page range | 214-214 |
| year | 1971 |
| URL | http://hdl.handle.net/10097/27625 |

Magneto-Plastic Effect in Nickel Single Crystals*

Shigeyuki HAYASHI, Seiki TAKAHASHI and Mikio YAMAMOTO

The Research Institute for Iron, Steel and Other Metals

Abstract

It has been observed that the flow stress of a nickel single crystal can be lowered about 15% by applying an alternating magnetic field parallel to the specimen axis during plastic deformation at -194°C . This phenomenon, named by us as the magneto-plastic effect, can be interpreted qualitatively in terms of a concept that oscillating magnetic domain walls give a force on dislocations.

In order to clarify this effect, its dependence on the temperature, plastic strain, strain rate, and on the strength and frequency of the alternating magnetic field applied have been measured. The activation volumes in relation to a thermally activated process of dislocation motion were also obtained from the stress relaxation curves measured after and before the application of an alternating magnetic field, and they were compared mutually at various values of the shear stress.

* The 1547th report of the Research Institute for Iron, Steel and Other Metals. Published in the Journal of the Physical Society of Japan, **30** (1971), 381.