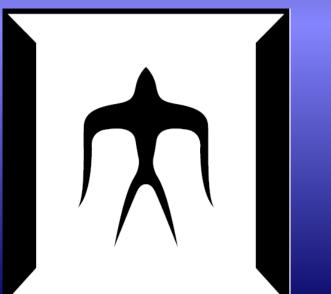
Mechanical testing of electrodeposited Ni film parallel and vertical to crystal growth direction using microsized cantilever specimens



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Introduction Evaluation of electrodeposited film Conventional method Very thin Several millimeters Deposited film Several dozen Tensile test Electrodepositing Removing substrate on substrate It is difficult to examine effects of grain growth direction. Several dozen New method micrometers Loading point Several dozen micrometers Specimen (b) Specimen (a) Loading point It is possible to examine effects of grain growth direction. Fabrication of cantilever

Bending test

Experimental

Electrodeposited Ni film

Substrate

Cu substrate

Reduction rate of cold rolling: 25% **Heat treatment: 1000K 1h**

Condition

Watt bath: NiSO₄(300g/L), NiCl₂(50g/L),

 $H_3BO_3(50g/L)$ additive free

Current density: 150A/m²

Temperature: 323K

Bending test

Micro-sized cantilever

Loading point $40\mu m$ **\$**10µm 10µm 50µm

Size: $10 \times 10 \times 50 \mu m$ Loading point: 40 µm

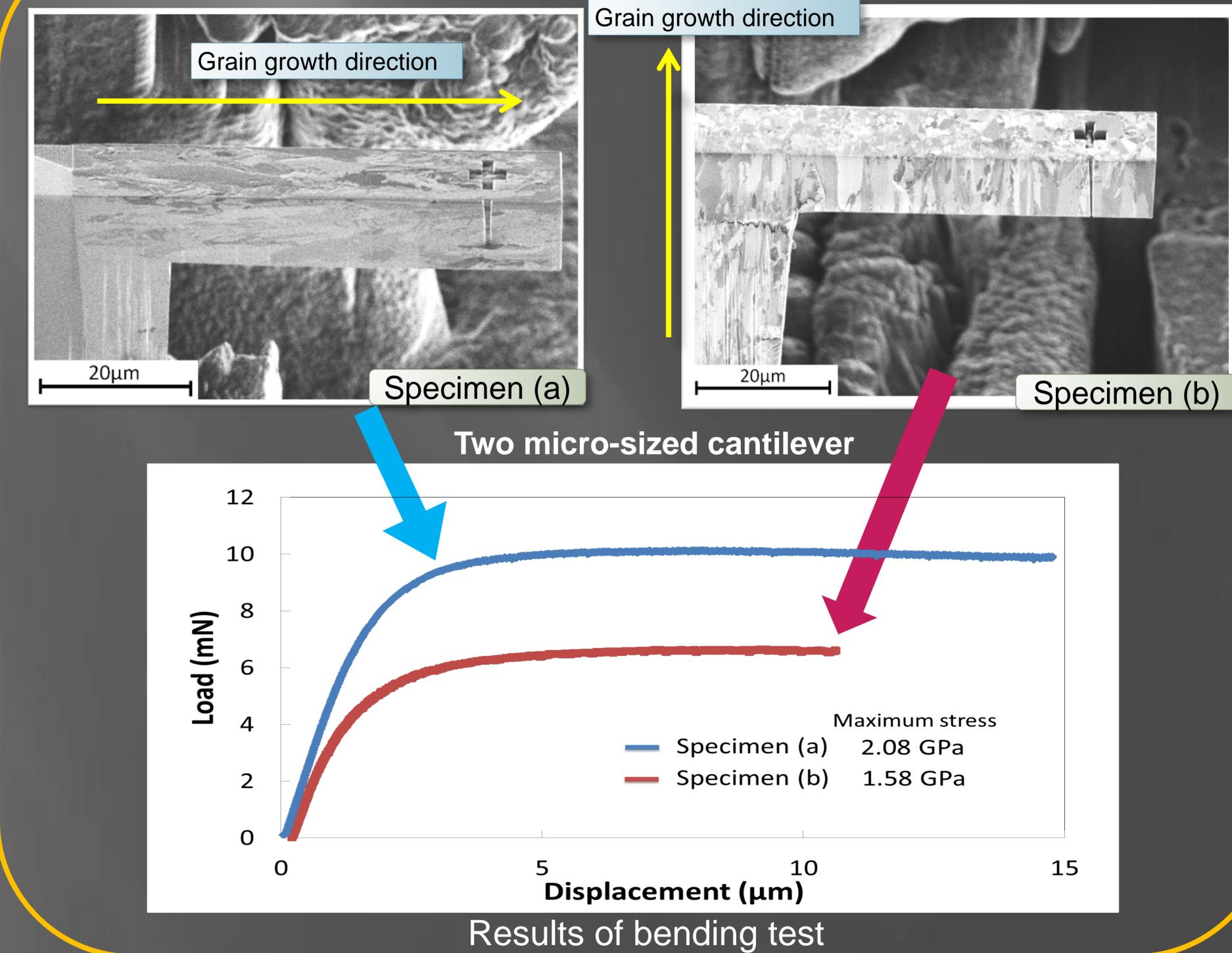
in electrodeposited film

from fixed end

Condition

Displacement rate : 0.1 µm/s

Result



Discussion

Results of EBSD analysis

- Deformation twin was observed at around the fixed end in specimen (a)
- Occurrence of deformation twinning is different

Summary

Difference in strength of anisotropic structure revealed by using micro-sized cantilever

