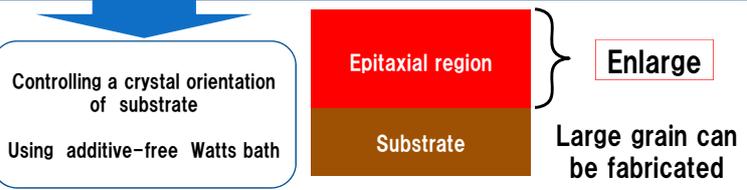
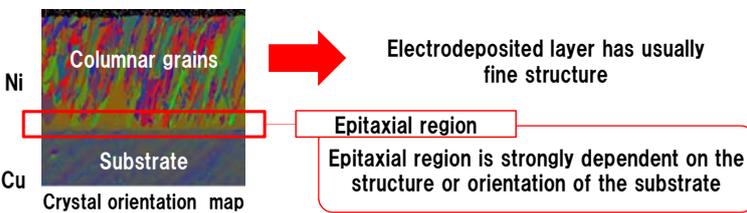


Abnormal large grains epitaxially grown in electrodeposited Ni layer on Cu substrate

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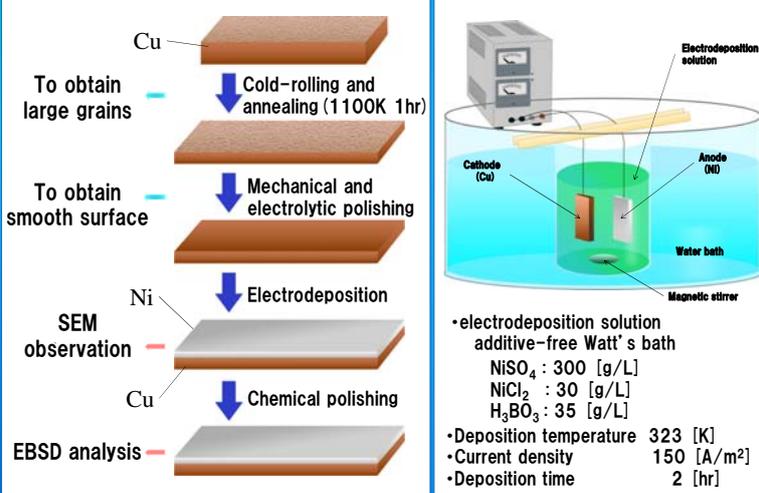
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Background

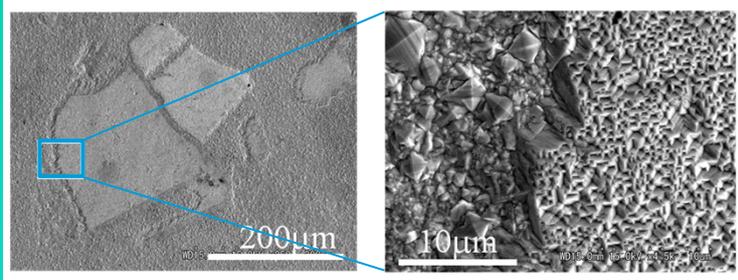


The objective of this study is to investigate relationship between crystal orientation in the epitaxial region and the substrate

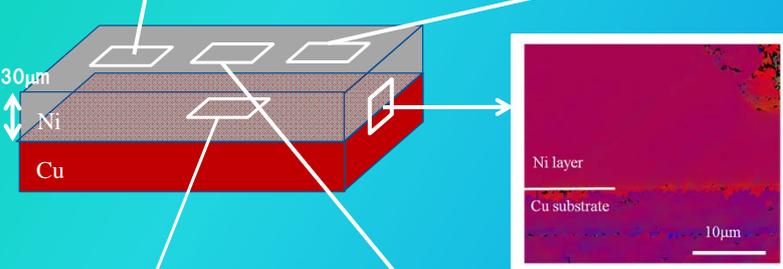
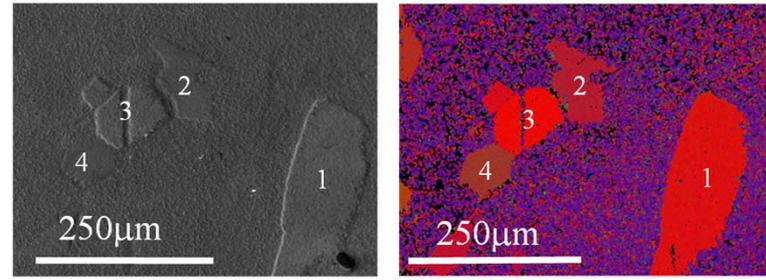
Experimental methods



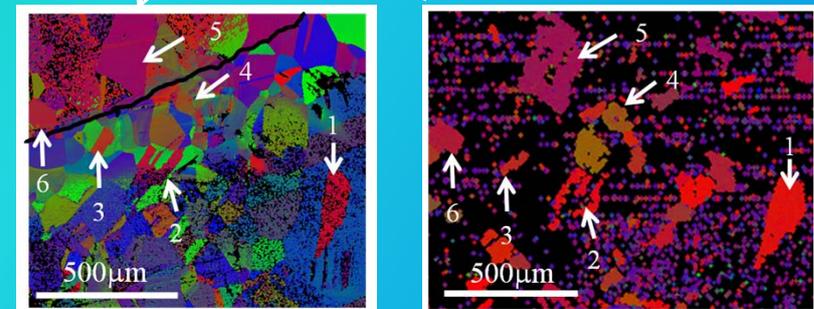
Surface morphology observed by SEM



Relationship between surface morphology and crystal orientation



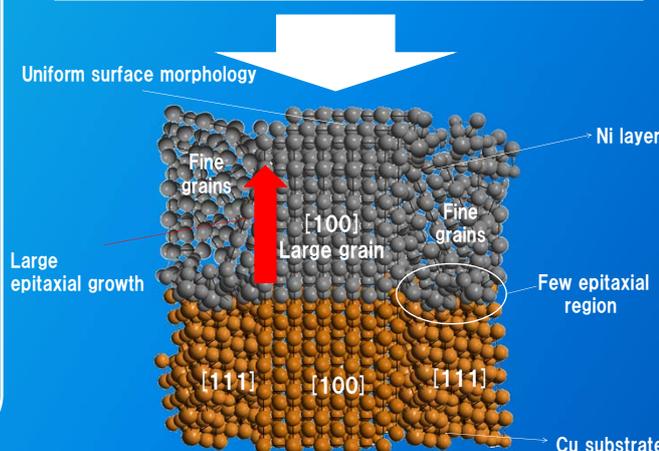
Cross-sectional crystal orientation map



Crystal orientation map (Cu substrate)

Crystal orientation map (Ni layer)

- Surface morphology indicates crystal orientation.
- Shape and crystal orientation of substrate correspond to that of abnormal large grain.
- The large epitaxial growth occurred on the substrate only with near [100] orientation.



Conclusions

We investigated the crystallographic relationship between Cu substrate and electrodeposited Ni layer. The electrodeposited Ni layer had a bimodal structure including abnormal large grains and fine grains. The surface morphology of the abnormal large grain is different from that of fine grains. The abnormal large grain was epitaxial region with the same orientation as the grains of the Cu substrate. Not only the crystal orientation but also the shapes of the abnormal large grains are affected by the grains of the substrate. The large epitaxial growth occurred on the substrate only with near [100] orientation. Therefore, abnormal large grain could not formed on the substrate with [111] or [110] orientation. The formation of abnormal large grain is caused by epitaxial growth on the substrate with a particular crystal orientation.

Acknowledgement

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