Investigation of Strain Within Niobium Grains

INTRODUCTION

Niobium is an element that when compared with other elements has a higher temperature at which it becomes superconducting. Strained niobium grains, (crystal structure) reduces the amount of current carrying capability thus reducing magnet strength. By using a scanning electron microscope (SEM) and "shooting" electrons at a sample crystal orientation information can be obtained. The focus of this investigation is to determine the possibility of measuring strain below 2%.

PROCEDURE

Sample Preparation

RESULTS

DISCUSSION

The Inverse Pole Figure (IPF) map color difference (orientation difference) of the grain in Fig. 12, indicates a slight misorientation evidenced by the gradual change in shading. However, the color variation in Fig. 14 is much greater, indicating a higher degree of strain in the grain of niobium. Analysis of data indicates the level of strain in Fig. 12 is 0.2% using a cosine function.

CONCLUSION

Strain in a linear direction was measured at .2%, which is within predicted limits, supporting our contention that measurements below 2% strain are attainable.

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