

Panel: Processes for texture control

Oxide dispersion strengthened rotary swaged copper

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We are studying oxide dispersion strengthened copper, which was sintered by rotary swaging. The research is a motivated effort to obtain a solid, mechanically stable microstructure with high electrical conductivity. Such structures have already been prepared by rotary swaging pure copper under cryo-conditions or even at room temperature. Several strengthening oxides were used for the preparation of forged bars, and for detailed research we used copper strengthened with Al<sub>2</sub>O<sub>3</sub>. The material was prepared by several procedures and subsequently annealed to obtain the optimal ratio of strength and conductivity. Using the SEM (including EDS and mainly EBSD) and XRD methods, it was found that the material prepared by rotary swaging has a strong texture with (001) and (111) components in the direction of the rod axis. The grains are extremely elongated and thus probably contribute to the high conductivity of the material. Annealing causes a breakdown of the texture, but the morphology of the grains created by the rotary swaging remains to a large extent preserved. The details of the microstructure were studied by TEM and confirm the conclusions of the other methods.

Key words:

Rotary swaging, copper, microstructure, EBSD, SEM