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SHORT COMMUNICATION

Comments on the Determination of Wire Textures

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The main goal in the determination of wire textures should be the accurate and complete determination of the whole texture including all types of textures in the material in question. In regard to the accuracy of texture determination and the thoroughness of texture analysis, the neutron diffraction technique and the three-dimensional orientation distribution function analysis have provided considerable improvements in texture investigations.

In a recent paper of Schläfer and Bunge[1] the textures of a cold drawn Al-wire were studied in great detail. Their analysis can be considered almost as complete as possible. However, their starting assumption that the geometrical conditions of the drawing process would produce a texture having axial symmetry is subject to questions as follows:

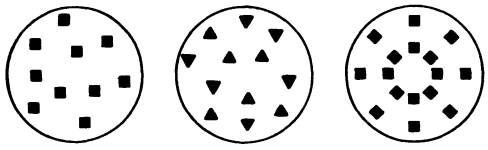

FIGURE 1 Schematic representation of some wire textures.
(*a*) a ⟨100⟩ single-crystal texture
(*b*) a ⟨111⟩ double single-crystal texture
(*c*) a ⟨100⟩ cyclic texture.

1) The above mentioned assumption requires a necessary presupposition, namely, the initial texture of the starting material is symmetrical with respect to the wire axis. This might have been true for their initial material, but in general, the wires are manufactured from the rods, whose textures are not necessarily symmetrical. Therefore, such an assumption about symmetry without experimental confirmation does not seem to be justified. Is it possible, that some types of textures were overlooked?

2) By the way the sample was prepared, it is possible that the radial anisotropy (single-crystal and double single-crystal textures are illustrated in Fig. 1) disappeared before it could be examined. If the radial anisotropy is to be studied, the sample must be a wire or a bundle of parallel wires. In the latter case the rotation angle of every piece of the wire in the sample can be different, and in this way the whole pole figure of the original wire can be determined (Fig. 2). A cyclic texture cannot be determined by means of this measuring technique, but only the radial anisotropy.

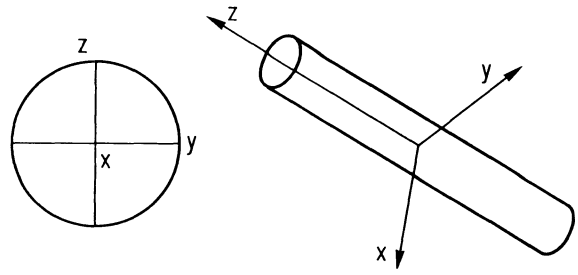

FIGURE 2 The coordinate system of the pole figure of a wire.

In regard to the question, whether the omission of the radial anisotropy means a real shortcoming in the wire texture analysis, the following can be stated.

a) Cyclic textures arise during the cold drawing process of the wire. Their amount is, however, not very large. Possible radial preferred orientations (i.e. single-crystal and double single-crystal textures) may remain, or even increase, during this drawing process.

b) The formation of the recrystallization texture can be followed by means of annealing the samples for radial preferred orientation examinations,

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whereas this is not possible for samples used by Schläfer *et al.* in their investigations.

c) The nature of the cyclic textures is more like fibrous than the nature of the radial preferred orientations.

Finally, it is suggested that when analyzing wire textures, the radial preferred orientations are also taken into consideration. This is possible when the neutron diffraction technique is employed and in addition, a proper sample is constructed. In this way a complete wire texture can be determined.

REFERENCE

1. U. Schläfer and H. J. Bunge, *Texture* **1**, 31 (1972).
2. J. Kajamaa, *On the Texture Strengthening of an Aluminium Strand*, Doc. Thesis, Tech. Univ. Otaniemi., Finland, (1970).