

The tendency of residual austenite to  $\gamma \rightarrow \alpha$  transformation during the deformation is different in the surface and central layers of the sheet. This is accounted for by the orientation relationship of strain martensite formation.  $\alpha$ -martensite is first of all formed in the sections of austenite having  $\{100\} \langle UVW \rangle$  or  $\{hk\ell\} \langle 011 \rangle$  -orientation.

Cold rolling with large amounts of reduction results in the formation of martensite texture typical for the deformation texture of b.c.c. metals and alloys:  $(100)[011]$ ,  $(211)[01\bar{1}]$ ,  $(111)[11\bar{2}]$  and  $(111)[01\bar{1}]$ .

**12.7-03** APPROXIMATION OF THE POLE DISTRIBUTION OF FIBRE TEXTURES BY SIMPLE FUNCTIONS. By A. Apostolov and I. Tomov, Institute of Physical Chemistry, Bulgarian Academy of Sciences, Sofia, Bulgaria.

The simple functions  $1/[1+(\theta-\theta_0)^2/\alpha^2]^3$  and Gaussian are found to give a good approximation of intensity distribution in the range of the maxima of the pole figures. The values of the intensities, expressed as multiples of the random distribution by means of the above functions, are calculated and applied to the volume fractions of fibre (axially symmetrical) textures. The calculations are performed with a method developed previously (Tomov, I., H.J. Bunge, *Texture of Crystalline Solids* (1979), 3, 73).

The determination of the volume fractions of the texture components of two nickel samples (with initial matrix orientation  $\langle 100 \rangle$  and  $\langle 110 \rangle$ , respectively) was carried out, for three different pole figures, both with approximating functions and with numerical integration by Simpson's method. A good fit was obtained. The errors in the methods of computation are discussed.

Evaluating the volume fractions by approximating functions requires less experimental data and a shorter time for calculation. The sharper the texture, the more precise is the evaluation of the volume fractions.

**12.7-02** DETERMINATION OF THE SHAPE OF CRYSTALLITES IN POLYCRYSTALLINE ZINC OXIDE. By D. Louër, R. Vargas, Laboratoire de Cristallographie, Université de Rennes, 35042 Rennes Cédex, France and J.I. Langford, Department of Physics, University of Birmingham, Birmingham B15 2TT, England.

In size determination by means of diffraction broadening it is often of interest to know the shape of crystallites and their relations with the structure and the external form. For example, if there is evidence that the crystallites are prismatic, by X-ray line profile analysis the shape and size of the domains and their orientation with respect to the crystallographic axes can be deduced. However, data of high quality are required and suitable reflexions must be available.

As an example of this procedure, the case of polycrystalline zinc oxide produced by thermal decomposition of zinc hydroxynitrate was considered. Indeed, the differences in the broadening of the diffraction lines are explained with an anisotropic shape of the diffracting domains (Auffrédic, Ciosmak, Louër and Niepce, *Proc. 9th I.S.R.S., Cracow, 1980*, p. 590-593). In this case, microstrains are negligible and preliminary analysis of the breadths of several reflexions indicated that, on average, the crystallites could be regarded as cylinders of height 250 Å and diameter 90 Å, with the cylinder axis parallel to the c axis. It therefore seemed reasonable to assume that the crystallites are in fact hexagonal. There are, then, two likely orientations of the domains, with the base edge parallel to the  $[100]$  direction or to the  $[110]$  direction. Theoretical models for diffraction line profiles have been derived for materials with the crystallite shape of a cylinder or a hexagonal prism. The two models are compared to the zinc oxide powder pattern.