12.6—1 LINE INTENSITY DECREASING SEMIQUANTI-
TATIVE METHOD IN X-RAY DIFFRACTION PHASE
ANALYSIS. By B. Gržeta and S. Popović, "Ruđer
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The doping method in quantitative X-ray diffraction
phase analysis, developed by Popović and Gržeta-
-Plenković (J. Appl. Cryst. (1979) 12, 205-208)
and Popović, Gržeta-Plenković and Balić-Žunić
(J. Appl. Cryst. (1983) 16, 505-507), requires
doping of the investigated multicomponent system by
known amounts of the components, the weight
fractions of which are to be determined. A variation
of the doping method is proposed in the present
contribution. It involves the addition to the investi-
gated system of known amounts of a crystalline
substance, X, not contained in the system. One
determines the added amount of X, for which the
intensity of the strongest diffraction line of a particu-
lar component falls below a small detectable value.
This enables the determination (estimation) of the
weight fraction of that component in the original
system. Also, the discussion on the applicability of
the method is given.

12.7—2 X-RAY LINE BROADENING DUE TO ELASTIC DEFOR-
MATION OF POLYCRYSTALLINE SAMPLES. By C.BALASINGH and
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tical Laboratory, Bangalore-560017, India.

The broadening of x-ray diffraction lines can arise
from many sources, such as, plastic deformation of the
specimen leading to decrease in the coherently diffrac-
ting domain size, increase in microstrains, etc (B.E.
Warren, Progr Metal Phys (1959) 8, 147). The fact that
elastic deformation can also lead to broadening was rec-
ognized long back (G.B.Greenough, Progr Metal Phys
(1952) 3, 176). However, no detailed experimental or
theoretical analysis of this aspect has been carried
out. A simple consideration indicates that broadening
from this source vanishes if the condition of strain
continuity (W.Voigt, Lehrbuch der Kristallphysik, Teub-
ner, 1928) across the crystallites is assumed. In this
paper, expression for the variance in strain (a measure
of broadening) has been derived for cubic system under
the condition of stress continuity (A.Reuss, Z. angew
Math U Mech (1929), 9, 49). The analysis indicates that
the variance vanishes for reflections of the type (h00)
and (hhh). It also vanishes for all reflections if the
anisotropy factor is zero. Diffraction line profiles
from annealed and deformed copper and iron specimens
have been recorded and the variance due to elastic broa-
dening calculated. A comparison has been made of the
experimental results with the theory.

12.7—1 RECONSTITUTION DES TRANSFORMEES DE FOURIER
DES PROFILS DE RAIES DE DIFFRACTION DES RAYONS X. Par
Rodolfo Vargas, Centro de Ingeniería Metalúrgica, Funda-
ción Instituto de Ingeniería, Apartado 40200, Caracas
1040-A, Venezuela.
　　Dans la caractérisation de l'élargissement des profils
de raies de diffraction des rayons X par l'analyse de
Fourier, les transformées de ces profils, interpretées
comme les "fonctions volume" des cristallites (Bertaut,
Acta Cryst. (1950) 3, 14), renseignent directement sur
les paramètres morphologiques du matériau. L'ajustement
des profils de raies à des expressions mathématiques a
été l'objet de travaux récents, des bonnes approches ont
été obtenues à l'aide des fonctions de Gauss, Cauchy,
Voigt, etc. Cependant il est possible de trouver une ex-
pression analytique des profils, ainsi qu'on le montre
dans ce travail.
　　Lorsque l'élargissement des profils est dû seulement
aux effets de taille et tenant compte que les cristalli-
tes ont tous la même forme alors la fonction volume re-
lative à tout l'échantillon V est la somme des fonctions
volume propres à un cristallite V, de forme et dimensions
données, ponderées par la distribution de tailles G;
c'est-à-dire, $V(t) = \int V(t,\ell) \; G(\ell) \; d\ell,$

où t est une variable (en Å) de l'espace directe et ℓ
est la dimension moyenne apparente d'un cristallite dont
la fonction volume est $V(t,\ell)$.
　　Une application aux raies 100, 110 et 102 d'une poudre
d'oxyde de zinc, les cristallites ayant une forme cylin-
drique (Vargas, Thèse, Rennes (1981)), est présentée. La
fonction volume pour une telle morphologie est calculée
d'après Langford et Louër (J. Appl. Cryst. (1982) 15,20)
et les fonctions de distributions de tailles ont été ob-
tenus par la méthode de Le Bail et Louër (J. Appl. Cryst.
(1978) 11, 50). Les resultats permettent de vérifier la
validité des critères de reconstitution des transformées
ainsi que des modèles considerés.

12.7—3 ON SUPPRESSING TEXTURE EFFECT IN
QUANTITATIVE ANALYSIS BY POWDER DIFFRACTION.
By M. Järvinen, Lappeenranta University of
Technology, LPR, Finland and J. Zábráczky,
ALUTERV-FKI, Budapest, Hungary.

The method for correcting integrated x-ray in-
tensities for preferred orientation (Järvinen
et. al. J. Appl. Cryst. (1970), 3, 313) is
developed for standard use in powder examin-
ations.

The intensities of several reflections meas-
ured by an ordinary powder diffractometer con-
tains a lot of information about the orienta-
tion distribution of the crystallites in the
specimen. This information can be extracted
by representing the orientation distribution
function in terms of site-symmetrized spherical
harmonics and by fitting the expansion with the
measured intensity data.

However, the use of a specimen spinner is
necessary in order to smoothen the distribution
function and to introduce cylindrical symmetry.
This reduces the sufficient number of texture-
parameters to 2 or 3.

As an example, the determination of Al_2O_3-con-
centration in an industrial alumina powder is
presented. The biggest correction was 52 %
the agreement between alumina and standard
corundum intensities being 6 %.