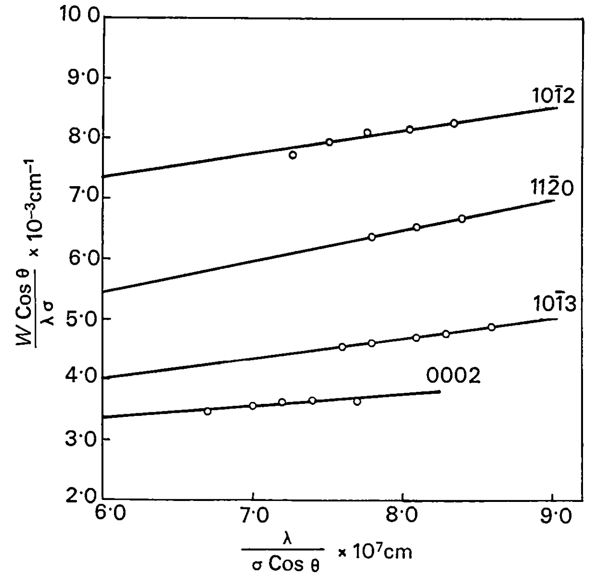

Fig. 1.

profiles used in the present investigation are those of Mitra & Misra (1967). Variances for 0002, $10\bar{1}2$, $11\bar{2}0$ and $10\bar{1}3$ reflexions have been determined both for deformed and annealed samples as functions of equal ranges σ (in 2θ) and hence those for pure diffraction profiles were obtained as a function of ranges σ (in 2θ). Plots of $W\cos\theta/\lambda\sigma$ *versus* $\lambda/\sigma\cos\theta$ as shown in Fig. 1 are straight lines as expected from equation (1). Particle size and strain are determined from the intercepts and slopes respectively along different directions and the results are shown in Table 1 with those obtained by Mitra & Misra (1967) by line shape analysis. Since the entire line broadening is not attributed to the particle size effect and strain effect by Lele & Anantharaman (1964), their results on cold-worked magnesium cannot be compared here.

Table 1 shows that particle size and strain determined by the present method are respectively greater (except for the 0002 reflexion) and smaller than those obtained by line shape analysis. These results are in conformity with those obtained by previous workers. For example, Michell & Haig (1957), Michell & Lovegrove (1960), Mitra (1964) have obtained different values of particle size and strain using different methods. Recently Aqua (1966) has investigated cold-worked aluminum using all the methods and has shown that when the proper angular range of integration is chosen, the particle size by each method is of the same order of magnitude. He has also shown that the average strain determined by the Fourier analysis is less than that obtained by integral breadth and variance, though the order of magnitude in the three cases is almost the same. The definition of strain and particle size is not same in each case so that some differences in particle size and strain values are not unexpected. Anisotropy in particle size is more prominent than that in strain. Since magnesium is elastically isotropic, the apparent strain anisotropy is perhaps due to limitations of experimental accuracy and the average value is probably the true value of strain. The particle size anisotropy may be attributed to a non-spherical shape of the particles which has not been taken care of by taking $K=1$.

Table 1. *Particle size and strain by different methods*

Lines	Particle size (Å) Variance method	Particle size (Å) Line shape analysis	Strain (10^{-3}) Variance method	Strain (10^{-3}) Line shape analysis
0002	563	720	1·46	7·58
$10\bar{1}2$	1013		1·18	
$11\bar{2}0$	1754	880	1·09	7·89
$10\bar{1}3$	2252	800	0·81	7·95

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The coherent neutron scattering amplitudes for seven isotopes of tin.*

By M. I. Kay, *Puerto Rico Nuclear Center, Mayaguez, Puerto Rico, and* H. L. Ritter,† *Puerto Rico Nuclear Center and Department of Chemistry, Miami University, Oxford, Ohio, U.S.A.*

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Scattering amplitudes were determined for the isotopes 116 through 120, 122 and 124 from an examination of the neutron powder patterns of SnO_2.

Coherent scattering amplitudes for thermal neutrons of the seven most abundant of the ten natural isotopes of tin were determined from an examination of the neutron powder patterns of SnO_2. Samples of SnO_2 were obtained from Oak Ridge National Laboratory, each enriched in one of the seven tin isotopes (ranging from 78·8 % for ^{117}Sn to 98·4 % for ^{120}Sn), and scanned from 16° to 46° in 2θ using neutrons of wavelength 1·064 Å. The cylindrical, tightly packed powder samples measured 2 cm in diameter by 3 cm long and were enclosed in a fused-quartz tube during ex-

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† ORINS Research Participation Fellow, 1966–67.

posure. The quartz background was separately measured and subtracted from the powder patterns. Absorption corrections were judged unnecessary. Integrated intensities were obtained for the following lines based on the tetragonal unit cell given by Baur (1956): 110, 200+111, 210, 211, 220, 002, and 112+301, the second and last being unresolved doublets.

The intensity of 210 is independent of $b_{\rm Sn}$ and that of (200+111) nearly so. A scale factor was computed from these two measured intensities (and subsequently corrected for the small contribution by $b_{\rm Sn}$ to 200) using $b_{\rm O}=0{\cdot}577\times 10^{-12}$ cm. Values of $b_{\rm Sn}$ were then calculated from each of the other five measured intensities. Isotropic temperature factors of $B=0{\cdot}7$ for oxygen and 0·4 for tin were found by trial and error to give the best agreement between calculated and observed intensities. It was also found that the position parameter, $x=0{\cdot}306$ gave better agreement than the 0·307 of Baur.

Average values of $b_{\rm Sn}$ for each of the seven known isotopic compositions of Sn were determined and from them the b's for each pure isotope were computed assuming that a measured $b_{\rm mix}=\Sigma a_i b_i$, where a_i is the fractional abundance, as reported by Oak Ridge, of each isotope in the sample. The resulting values are:

Isotope	Scattering amplitude, b ($\text{cm}\times 10^{-12}$)
116	$0{\cdot}58\pm0{\cdot}01$
117	$0{\cdot}64\pm0{\cdot}025$
118	$0{\cdot}58\pm0{\cdot}01$
119	$0{\cdot}60\pm0{\cdot}025$
120	$0{\cdot}64\pm0{\cdot}01$
122	$0{\cdot}55\pm0{\cdot}03$
124	$0{\cdot}59\pm0{\cdot}02$

Each error listed is twice the average deviation from the mean of the five separate determinations for that sample. The average of these values is 0·61, weighted in accordance with the natural abundance of the isotopes and allowing for the fact that these seven isotopes make up only 98% of natural tin.

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Notes and News

Announcements and other items of crystallographic interest will be published under this heading at the discretion of the Editorial Board. The notes (in duplicate) should be sent to the General Secretary of the International Union of Crystallography (G. Boom, Department of Metallurgy, University of Oxford, Parks Road, Oxford, England). Publication of an item in a particular issue cannot be guaranteed unless the draft is received 8 *weeks before the date of publication.*

International Union of Crystallography

Commission on Neutron Diffraction

One of the activities of the Commission on Neutron Diffraction is the collection of additional and more accurate values of neutron scattering amplitudes and it is hoped to publish up-to-date lists from time to time. It would be a great help if news of all newly determined values, whether announced in published papers or not, could be sent to the Chairman, Prof. G. E. Bacon, The University, Sheffield S10 2TN, England.