Pellets of the ferrimagnetic material Ba$_3$Co$_2$Fe$_{24}$O$_{41}$ were sintered at temperatures between 1220 °C and 1310 °C in (1) a non-oriented state, (2) with a fibre texture generated by a rotating magnetic field during pressing and (3) with a fan texture due to a static magnetic field. During sintering up to 24 h, the changes in texture sharpness and density were studied. Textured samples attained a higher ultimate density than non-oriented ones and those with fibre texture became densest. To determine the sharpnesses of the texture the maximum standardized intensities of the reflexions 0.0.0.14, 1.0.1.16, 1.1,2.10 and 11.0 were calculated from the experimental intensities. The mutual relations of the maximum standardized intensities of the four reflexions were given by representing the intensities of these reflexions for both textures as polynomials. The dependence of sharpness of texture on position in the pellet has been determined. It followed that this sharpness had to be averaged over the height of the pellet, to get a representative value for the whole pellet. Both kinds of texture were found to sharpen during normal grain growth, but during exaggerated grain growth in the last stage of sintering the sharpness of the fibre texture decreased, whereas that of the fan texture still increased. A possible explanation of this phenomenon is given on the basis of the different characters of these textures. A linear relationship is found between sharpness of texture and area porosity during normal grain growth. The compound starts decomposing at a lower temperature than that given in literature.

1. Introduction

In a previous paper (Huijser-Gerits & Rieck, 1974b), the relation between grain growth, preferred orientation and porosity of the ferrimagnetic material Ba$_3$Co$_2$Fe$_{24}$O$_{41}$, prealigned in a rotating magnetic field and sintered at 1260 °C, was reported. However, in order to obtain in this material, which has technical applications, a microstructure with optimal physical properties, it is also necessary to know the relation between time and temperature of sintering and the factors which determine the microstructure, such as grain size, density and texture. In a sample of this material different types of crystallographic preferred orientation (or texture) may occur, depending on the magnetic anisotropy of Ba$_3$Co$_2$Fe$_{24}$O$_{41}$ at room temperature and the kind of magnetic field that is applied during the pressing of the powders (Huijser-Gerits & Rieck, 1974b). Investigated are:

(a) textureless material, to be used as 'reference standard', obtained by isostatic pressing of powder encapsulated in rubber without a magnetic field being applied;

(b) material with a fibre texture (Huijser-Gerits & Rieck, 1974b), pressed at room temperature in a rotating magnetic field;

(c) material with a fan texture (Huijser-Gerits, Rieck & Vogel, 1970), pressed at room temperature in a static magnetic field.

The materials are sintered under 1 atm oxygen at temperatures of 1220, 1260, 1290 and 1310 °C, which are all within the homogeneity range of the compound. Of these three types of textured material the changes in texture and density with sintering time are studied, as well as the occurrence of exaggerated grain growth and its effect on the final structure. As earlier microstructure investigations (Huijser-Gerits & Rieck, 1974b) have revealed, the densification process is not completely uniform and differences in density, as well as in texture, have been found over the height of the samples. This phenomenon had to be studied further. Finally the composition of the material after sintering had to be checked, in view of the possibility of chemical changes.

2. Experimental procedures

For the preparation of the samples reference is made to previous papers. The textureless samples (a) are prepared and selected according to Huijser-Gerits & Rieck (1974a, b). The samples with fibre texture (b) are made as described by Huijser-Gerits & Rieck (1974b) and those with fan texture (c) according to Huijser-Gerits, Rieck & Vogel (1970). The measuring techniques used are also described in these previous papers. Crystallographic textures are determined as done by Huijser-Gerits, Rieck & Vogel (1970). In order to obtain standardized intensities for a sample with a certain amount of texture, the measured intensities have to be corrected for changes in focusing conditions at different tilting angles. For this correction according to Holland (1964), it is necessary to know the intensities of a non-oriented sample and these are measured and calculated as described in Huijser-Gerits, Rieck & Vogel (1970) and Huijser-Gerits & Rieck (1974a). As regards the density measurements, grain size determinations by means of 'average intercept line length' and 'area pore fraction', we refer to Huijser-Gerits & Rieck (1974b). In several cases the composition of samples is checked by examining their X-ray powder diffraction pattern. In some cases an electron-probe
microanalyser is used to determine the chemical composition.

3. Standardized intensities of reflexions

If the reflexion method is used to determine the preferred orientation, only regions up to at most 70° from the centre of the pole figures can be measured. In our case the transmission method, which could complete the measurements, cannot be used to determine the remaining part of the pole figures, because it is impossible to cut thin slices of the porous material. To get, nevertheless, a complete description of the orientation distribution, pole figures were constructed from two samples, one parallel (out of the central portions) and one perpendicular to the pressing direction, denoted by L and D respectively.

On the other hand it is possible to calculate the standardized intensity of a reflexion which has not been measured on a certain sample, from the standardized intensity of another reflexion.

For this purpose, polynomials are used to represent the pole densities for both textures. This pole density function is equal to the standardized intensity defined in Huijser-Gerits, Rieck & Vogel (1970).

For a fibre texture in which the hexagonal c axes of the crystals are mostly parallel to the fibre axis (see Stäblein & Willbrand, 1966, 1971; Stäblein, 1966) the pole density function \( f(\alpha) \), in which \( \alpha = \angle \text{between 0001 normal and the fibre axis} \), is:

\[
f(\alpha) = \sum_{n=0}^{\infty} C_{2n}(2n+1) \cos^{2n} \alpha.
\]

The pole density function \( g(\beta, \phi) \) for an arbitrary reflexion plane \((hkil)\), with an angle \( \phi \) between its pole and the \((0001)\) pole and an angle \( \beta \) between relevant direction and the fibre axis is:

\[
g(\beta, \phi) = \sum_{n=0}^{\infty} C_{2n}(2n+1)
\times \sum_{k=0}^{n} \binom{2n}{2k} \frac{1 \cdot 3 \cdots (2k-1)}{2^{k} k!} M^{2(n-k)} N^{2k}
\]

in which \( M = \cos \beta \cdot \cos \phi \); \( N = \sin \beta \cdot \sin \phi \). A simple approximation can be made by taking all values of \( C_{2n} = 0 \) except for \( n = i \), in which case:

\[
f(\alpha) = (2i+1) \cos^{2i} \alpha
\]

and

\[
g(\beta, \phi) = (2i+1)
\times \sum_{k=0}^{i} \binom{2i}{2k} \frac{1 \cdot 3 \cdots (2k-1)}{2^{k} k!} M^{2(i-k)} N^{2k}.
\]

In Fig. 1 the results of a calculation of the function \( f \) and \( g \) for \( i = 5 \) are represented.

The polynomials for a fan texture in the most general form are somewhat more complicated, see Stäblein (1966). Therefore we only give the simplified** polynomials. The pole density function of the \((0000)\) planes can be approximated by

\[
f(\alpha) = \frac{1 \cdot 3 \cdots (2i+1)}{2^i i!} \sin^{2i} \alpha
\]

and for general planes by

* Meaning: using one term, which approximation will nevertheless be referred to as 'polynomials'.
\[ g(\beta, q) = \frac{1 + 3(2i + 1)}{2^i \cdot i!} \sum_{k=0}^{i} \left( i \right) \left( -1 \right)^k \left( \frac{2k}{2^k} \right) \cdot \frac{1 + 3(2i - 1)}{2^i \cdot i!} \cdot M^{2k - i} N^{2r}. \] (6)

In Fig. 2 the results of the calculations of the functions \( f \) and \( g \) for \( i = 5 \) are represented.

If the pole density function for one reflexion has been determined by adapting such a value of \( i \) that the calculated pole density function closely approximates the experimental standardized intensity curve, the pole density functions of other reflexions can be calculated.

To determine the preferred orientation the reflexions given in Table 1 are studied. Most of the specimens prepared by method (a) do not show a preferred orientation after sintering. The ratios of the intensities of the four reflexions mentioned above are, within the accuracy limits of the measurements, the same for both \( L \)- and \( D \)-type specimens.

<table>
<thead>
<tr>
<th>Reflexion</th>
<th>Relative intensity: ( I/I_0 \exp ) (Fe Kα)</th>
<th>Angle between Bragg plane and (0001) normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00.14</td>
<td>17</td>
<td>30° 08'</td>
</tr>
<tr>
<td>1.0.1.6</td>
<td>100</td>
<td>41° 28'</td>
</tr>
<tr>
<td>1.1.2.10</td>
<td>69</td>
<td>44° 43'</td>
</tr>
<tr>
<td>1120</td>
<td>95</td>
<td>38° 46'</td>
</tr>
</tbody>
</table>

4. Results and discussion

4.1. Densification during sintering

Of the three materials with different texture the isothermal densification process has been followed by measuring their bulk density after heating at temperatures between 1220 and 1310°C for different periods.

In Fig. 3 these densities versus sintering time at four temperatures are plotted for the non-oriented material. The maximum density obtained was 5.10 g cm\(^{-3}\), which is only 95.5% of the value of the theoretical density of 5.35 g cm\(^{-3}\). This relatively low maximum density may be caused by the occurrence of exaggerated grain growth, by which process pores are enclosed within the grains during the very fast grain-boundary movement. The volume diffusion, by which the gas trapped in the pores would have to escape in this case, is much slower than the grain-boundary diffusion process. Therefore, the increase in density is less or may even stop after exaggerated grain growth has started. The exaggerated grain growth has been found at 1260°C after 10 h, at 1290°C after 2 h and at 1310°C already after 10 min sintering time.

The differences in densities between the two samples drilled out of the same pellet in two mutually perpendicular directions are, with only a few exceptions, very small and within the limits of the accuracy of the measurement (± 0.02 g cm\(^{-3}\)). In Figs. 3, 4 and 5 each point represents the average of the values of the two samples. Some samples had to be rejected for density measurement because they showed one or more microcracks. In Fig. 4 the densification of the material with a fibre texture is given. Here the maximum density obtained is 5.28 or 98.7% of the theoretical density. This textured material reaches a higher density than the non-oriented one. The beginning of the exaggerated grain growth during the densification occurs at the same temperatures and times as in the non-oriented materials.

In Fig. 5 the densification of the material with a fan texture is given, showing a maximum density of 5.19 or 97% of the theoretical value. The exaggerated grain growth starts under the same conditions as in the non-oriented material.
above-mentioned cases. Apparently the texture does not affect the start of the exaggerated grain growth.

4.2. Fibre texture

The texture occurring in the samples prepared by method (b) proved to be a fibre texture, which could be reasonably approximated by means of the simplified polynomials of equations (3) and (4). An example is given in Fig. 1, in which the standardized intensities of the specimens sintered for 10 min at 1220°C are shown along with \( f(\alpha) \) and \( g(\beta, \varphi) \) calculated for \( i = 5 \). Henceforth, the maximum of the standardized reflexion intensity will be used in order to compare the sharpness of the appropriate textures in an easy way. A higher

Fig. 5. Bulk density versus sintering time for fan-textured samples.

Fig. 6. Maximum standardized intensities of the 000,14 reflexion versus those of the 1,0,1,16 reflexion, both measured on the same sample surfaces. The theoretical curve is calculated by means of the polynomials of equations (3) and (4).

maximum will correspond to a relatively sharper texture. For about one hundred sections perpendicular to the fibre axis of L-type specimens the maximum of the standardized intensity of reflexions 000,14 and 1,0,1,16 have been measured. On the other hand, with the polynomials each value of \( i \) gives values for the maximum standardized intensities for both reflexions. In Fig. 6 the measured and calculated values are compared.

For some 80 sections parallel to the fibre axis of D-type samples the maximum standardized intensities of the reflexions 1120 and 000,14 are compared in Fig. 7 with the values calculated from the polynomials. Figs. 6 and 7 show that the difference between the calculated approximations and the experimental values is about 7%. It has been assumed that the difference between experimental and calculated (Fig. 8) ratios of the 1120 and 000,14 maximum standardized intensities are of the same order. Under this assumption a comparison between the sharpnesses of texture of the 000,14 and 1120 reflexions, measured on L- and D-type samples respectively, is possible. The comparison is of importance in order to determine
whether an inhomogeneity in local pressure during the pressing of the samples has an influence on the degree of the texture.

In order to check the influence of the height in the pellet at which the L sample is taken, the maximum of the standardized intensity of the 0,0,0,14 has been measured several times on an L sample of which after each measurement a few millimeters were abraded perpendicular to the fibre axis. The intensities for the sample which was heated for 24 h at 1220°C are given in Fig. 9. Similar curves were obtained for other pellets heated at this temperature for different periods of time. At higher sintering temperatures a considerable divergence in results was found due to the occurrence of exaggerated grain growth.

In order to determine a maximum standardized intensity giving the texture sharpness representative of the whole sample, the results for the different heights were averaged, with the exception of those measured in the outer 2 mm layers of the pellets, where external influences are large.

As regards the D samples, the same procedure of averaging was used. After the samples had been abraded no clear shift in the maximum standardized intensity could be established. This indicates that in a plane perpendicular to the fibre axis, the sharpness of the texture is rather constant, in contrast to that in a plane parallel to that axis.

For the study of the influence of sintering conditions on texture sharpness, the average maximum standardized intensities of the 0,0,0,14 reflexions of L samples are plotted against the sintering time for different temperatures [Fig. 10(a)]. The 1,0,1,16 reflexion intensities give in essence the same results. The curves show that at first the texture sharpens by normal grain growth and decreases as soon as exaggerated grain growth has been observed microscopically. For D samples the maximum standardized intensities of 1120 versus the sintering time are plotted in Fig. 11. In this case the 1,1,2,10 reflexion gives results analogous to those of 1120. The results for the L samples can be compared with those of the D samples by calculating the curves which are to be expected for 1120 from the curves of 0,0,0,14 (both for L samples) by means of the relation given in Fig. 8. The results of this calculation are given in Fig. 10(b) and these are to be compared with the curves from measurements of 1120 on D samples given in Fig. 11.

The conclusions which can be drawn from this comparison are that:

(i) at 1220°C the texture sharpness is about 15% lower in L samples than in D samples. This rather large

![Fig. 9](image-url) // Maximum standardized intensities of 0,0,0,14 and 1,0,1,16 reflexions versus the abraded height h of the L sample sintered at 1220°C for 24 h.

![Fig. 10](image-url) // (a) Maximum standardized intensity of the 0,0,0,14 reflexion measured on L samples versus the sintering time at different temperatures. (b) Maximum standardized intensity of the 1120 reflexion, calculated from the results for the 0,0,0,14 reflexion, versus the sintering time.
difference is probably due to the fact that these D samples had to be machined from the upper part of the pellet where the texture is sharpest.

(ii) at 1260°C the results for L and D samples are almost identical for the same sintering times, except after 24 h. This discrepancy can be attributed to the fact that exaggerated grain growth starts sooner in D than in L samples.

(iii) at 1290°C the D samples show a decrease in texture sharpness after only 2 h whereas in L samples this occurs after 4 h, resulting in a sharper texture in the latter during the subsequent sintering process.

(iv) at 1310°C both L and D samples show a sudden decrease in texture after 10 min; thereafter the development in texture is somewhat different for the two types.

Further discussion of the curves shown in Figs. 10(a) and 11 will be given in § 4.4. where similar curves measured on fan-textured samples are discussed.

4.3. Fan texture
The samples prepared by method (c) had a fan texture as shown by Huijser-Gerits, Rieck & Vogel (1970). This texture could be approximated by means of the polynomials of equations (5) and (6). The functions $f(\alpha)$ and $g(\beta, \theta)$ calculated for $i = 5$ are given in Fig. 2 along with the standardized intensities of samples sintered for 24 h at 1220°C.

By comparing Fig. 2 with Fig. 1 in which the standardized intensities of a fibre-textured sample are given, it can be seen that the fan texture has a less pronounced character. Therefore, as a result of the relatively lower maximum intensities, the measuring error is larger for the fan texture, especially for the weaker reflexions 0,0,0,14 and 1,1,2,10.
In Fig. 12 the maximum standardized intensities of the 1,1,2,10 reflexion are plotted against those of the 1120 reflexions along with the theoretical approximation calculated with equations (5) and (6). In this figure, as a result of the lower accuracy, a much larger scatter occurs than in the comparable Fig. 7 for the fibre texture. In the L samples with fan texture the influence of the height of the sample (parallel to the pressing direction) on the degree of texture has also been determined. Fig. 13 shows the results for a sample sintered at 1220°C for 24 h. A comparison with Fig. 9 indicates that this curve is similar to that found in the samples with fibre texture. Therefore the same method of calculating an average maximum standardized intensity has been used. In Fig. 14 the maximum standardized intensities of the 1120 reflexion of the L samples are plotted against the time of sintering for temperatures of 1220, 1260 and 1310°C. The sharpness of the texture is seen to increase with heating time even after exaggerated grain growth has taken place. The latter behaviour is in contradiction to that found in samples with fibre texture.

Contrary to the results on D samples with fibre texture, there proved to be an appreciable dependence of the sharpness of the fan-texture on the height in the D sample, as Fig. 15 illustrates. This means that the texture at the side of the pellet from which the D sample has been machined, is sharper than that in the centre of the pellet. Apart from this the evaluation of the measurements on these D samples is hampered by the following circumstances:

(i) The 0,0,0,14 maximum standardized intensities are inaccurate because the measured intensities of this reflexion are very low.

(ii) The 1,0,1,16 maximum standardized intensity increases only slightly with texture sharpening. Most of the averaged standardized intensities are between 1.2 and 1.6 times the intensity of the random sample.

Therefore the results of the measurements on D samples with fan textures had to be disregarded.

4.4. Influence of grain growth

As stated by Huijser-Gerits & Rieck (1974b) the sharpening of the texture due to normal grain growth in fibre-textured samples could be explained by the assumption that some well-oriented grains grew quickly at the expense of the poorly oriented ones. On the other hand, Hillert (1965) explains the normal grain growth on the basis of the elimination of small particles in favour of the large ones. The explanations are in accordance with one another if the larger grains are also the ones which are better oriented. This condition might well be fulfilled, because in the process of magnetic alignment a larger particle will be subjected to a larger magnetic force.

As soon as the discontinuous or exaggerated grain growth becomes appreciable the texture sharpness in fibre-textured samples decreases rapidly, whereas in the fan-textured samples it even increases slightly.

Two causes of grain growth which could explain the change in texture during the last stage of sintering are mentioned in the literature:

(i) Reed & Fulrath (1973) and Tokar (1968) reported a substantial increase in preferred orientation as a result of exaggerated grain growth. This exaggerated grain growth was promoted by the presence of a liquid phase as was found by Reed & Fulrath (1973) and earlier suggested by Kooy (1962). In our case however, exaggerated grain growth has a totally different effect on fan and fibre textures. Moreover, photographs taken with optical and electron microscopes do not reveal traces of liquid phases which could have been present at grain boundaries.

(ii) The grain-growth rate is dependent on orientation. According to Novikov (1970) there is a definite relation between the mean grain-growth rate of large

![Fig. 15](image)

Fig. 15. Maximum standardized intensity of the 1,0,1,16 reflexion versus the abraded height \( h \) of the D sample sintered for 2 h at 1290°C.

![Fig. 16](image)

Fig. 16. Maximum standardized intensity of the 0,0,0,14 reflexion versus the area porosity measured on L and D samples with fibre texture.
grains and their orientation at the beginning of secondary recrystallization. Beck (1951) found that in recrystallizing metals the mobility of a boundary between two grains with large difference in orientation exceeds that of a boundary between two grains with a small angle of disorientation.

Applied to the present case, in the samples with sharp fibre textures a well-oriented crystallite has a much larger chance of having a neighbour with about the same orientation, and therefore a slow-moving boundary, than one of the few poorly oriented crystallites, even if the freedom of rotation around the c axis for well-oriented crystallites is taken into account. Therefore, in the last stage of sintering the well-oriented grains would have lost their lead in growing out and the sharpness of the texture would decrease, because the poorly oriented grains are growing out.

On the other hand, the character of the fan texture differs from that of the fibre texture in the respect that the meeting of two well-oriented grains with a small angle of disorientation will be less frequent. Many well-oriented grains may in the last stage of sintering therefore have the same opportunity as the poorly oriented ones to grow out. So the overall texture does not change much and may even sharpen slightly by exaggerated grain growth.

4.5. Texture sharpness and area pore fraction

According to Huijser-Gerits & Rieck (1974b) the texture sharpness at a sintering temperature of 1260 °C is approximately proportional to the average intercept line length, which in turn is proportional to the area pore fraction. As in the measurements leading to this conclusion the texture sharpness and the area pore fraction were determined on the same specimen surface, all problems of non-uniform distribution of the two properties throughout the pellet are ruled out. In order to avoid errors due to the occurrence of aggregates with a higher density than the surrounding matrix, as mentioned by Bratton (1971), the area pore fraction has been calculated by means of photomicrographs of five different places in each sample surface.

It had to be checked whether the above-mentioned proportionality was valid for other sintering temperatures. Therefore on 34 surfaces of L and D samples with fibre texture which were sintered at 1220, 1260, 1290 and 1310 °C, the texture sharpness and area pore fraction were measured. For this purpose the intensities of the 1120 reflexion of the D samples were converted into intensities of the 0,0,0,14 reflexion by means of the (theoretical) approximation of Fig. 8. From Fig. 16, where the 0,0,0,14 intensities are plotted versus the area porosity, it can be seen that the two quantities are linearly related during the intermediate stage (II) of sintering in which normal grain growth occurs. According to the previous results of Huijser-Gerits & Rieck (1974b), the maximum standardized intensity of the 0,0,0,14 reflexion in fibre-textured material is linearly dependent on the average intercept line length, which is a measure of the grain size. Therefore the grain size is also a linear function of the area porosity. This linear relation between \( P (=\text{porosity}) \) and \( a (=\text{grain size}) \) seems to be better obeyed than those of Kuczynski (1973) between \( \ln P \) and \( a \), and Coble (1961) between \( P \) and \( \ln a \).

In the early stage of sintering (I), no appreciable grain growth takes place (see e.g. White, 1962). Discontinuous (exaggerated) grain growth occurs in the final stage of sintering (III) in which the area porosity is smaller than 5%.

For 26 surfaces of L samples with fan texture the texture sharpness is plotted versus the area pore fraction in Fig. 17. Again a linear relation between texture sharpness and area pore fraction occurs in stage II,
independent of the combination of sintering temperature and time at which the appropriate area porosity is achieved.

As grain growth and texture sharpness are directly related, both in fibre and fan-textured samples, it follows that at a certain grain size a certain porosity or density occurs independently of the applied sintering process. Therefore for this material the only way to obtain a dense sintered material with small grain size is to start with a high green density.

4.6. Composition

On X-ray diffraction diagrams of the unsintered powder the lines of Co$_2$Z and very weak ones of Co$_2$Y* were identified. From sintered specimens, diagrams were made in the range of 20–120° 2θ with a Philips diffractometer PW 1050 using Fe Kα radiation. These diagrams showed only Co$_2$Z lines (see Braun, 1957 and Vinnik, Arganovskaya & Semenova, 1965). Microscopic investigation of several sintered specimens, in which exaggerated grain growth had occurred, indicated that new grains of another phase were formed inside the very large grains of Co$_2$Z, as is shown in Fig. 18. Even after prolonged heating, in which the new phase increased in quantity, as could be proved microscopically, an X-ray diagram did not clearly show diffraction lines of this new phase. Therefore the composition of the grains in a few of these specimens was investigated with an electron-probe microanalyser (AEI, type SEM 2).

Figs. 19(a), (b) and (c) show the results of this microprobe analysis, in which were measured Co Kα, Ba Lα, and Fe Kα radiations coming from the sample which was sintered during one week at 1310°C in pure oxygen. It was found that the new phase contained less Ba and more Co and Fe than the surrounding Co$_2$Z phase. It can be assumed therefore that the Co$_2$Z has partly decomposed, possibly into BaCo$_2$Fe$_{15}$O$_{27}$. According to the X-ray diffraction results of Vinnik, Arganovskaya & Semenova (1965) this process does not occur below 1350°C in air. To verify these results samples were sintered in air in the same way as in oxygen. The microprobe analysis showed the same decomposition as occurred after 24 h at 1290°C or 4 h at 1310°C. Therefore the phase diagram published by Vinnik (1965), may need a correction not only on the basis of the better information obtainable by microprobe analysis, but also because the annealing period of 4 or 20 h at 1250°C, applied by that author, is insufficient.

Conclusions

1. The highest density obtained in specimens with fibre texture is 98.7%, with fan texture 97.0%, and in non-oriented specimens 95.5% of the theoretical density.

* Co$_2$Z stands for the compound Ba$_3$Co$_2$Fe$_{24}$O$_{41}$ and Co$_2$Y for Ba$_2$Co$_2$Fe$_{12}$O$_{27}$.

Fig. 19. Microprobe analysis by means of (a) Co Kα, (b) Ba Lα and (c) Fe Kα radiation of partly decomposed Co$_2$Z.
2. The development of the preferred orientation throughout the pressed and sintered pellet is dependent on the position in the pellet.

3. The fibre texture as well as the fan texture sharpens during sintering by normal grain growth.

4. During the intermediate stage of sintering the sharpness of fibre and fan textures are linearly related to the area porosity.

5. The temperature at which the exaggerated grain growth starts seems to be independent of the kind of texture.

6. Exaggerated grain growth decreases the fibre texture sharpness and has little or no influence on the fan-texture sharpness.

7. CoZ has already decomposed during heating in air or in oxygen after about 24 h at 1290°C and after about 4 h at 1310°C. This is in contradiction to the results of Vinnik, Arganovskaya & Semenova.

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References
