

## Slip-bands and Twin-like Structures in Crystals

THE  $\beta$ -constituent of the copper-zinc alloy system containing about 48-50 per cent zinc and having a cubic body-centred crystal lattice, does not readily show slip-bands when the crystals are distorted<sup>1</sup>. On the other hand, structures resembling twins have been described<sup>2</sup>. v. Göler and Sachs<sup>3</sup> found slip-bands on some crystals only and identified them approximately with traces of dodecahedral planes  $\{110\}$ . I have recently confirmed the occurrence of slip-bands agreeing with the traces of  $\{110\}$  planes in a number of crystals (Fig. 1), and in some cases the distortion can be accounted for completely by slip on one of these planes and in a direction parallel to the normal of an octahedral plane  $[111]$ . More often, the distortion is more complicated and other dodecahedral planes are involved. In these circumstances, the slip-bands do not represent crystal planes, but relics on the surface of the original traces of planes.

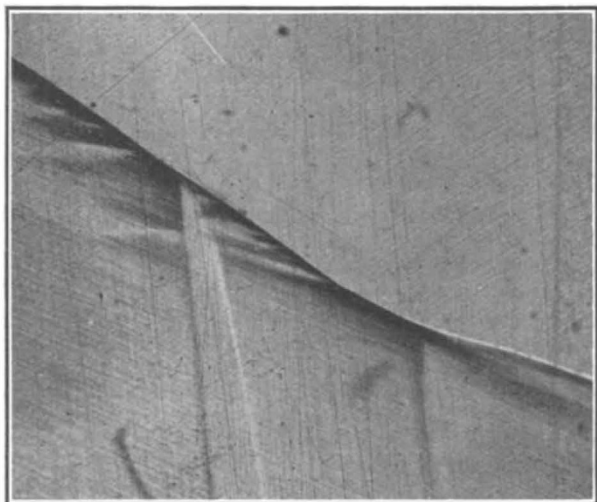


FIG. 1. Two deformed  $\beta$  brass crystals showing slip-bands and twin-like structure near boundary.  $\times 100$ .

Twin-like structures are produced when slip takes place on two planes equally inclined to the axis (in a tensile test) in different parts of the same crystal. This frequently occurs if the axis lies in a  $\{100\}$  plane, for example, when the uniting plane coincides with this plane at the beginning of the distortion, but soon ceases to do so as deformation proceeds. These structures persist when the crystal is repolished and re-etched and resemble lamellar twinning if there are many of them.

When the crystals are rolled, they fracture with an almost perfect cleavage parallel with one or more  $\{110\}$  plane. The separation occurs with a loud crack.

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<sup>1</sup> G. I. Taylor, *Proc. Roy. Soc.*, A, 5, 118; 1928.

<sup>2</sup> F. Johnson, *J. Inst. Metals*, 5, 24, 301; 1920.

<sup>3</sup> v. Göler, G. Sachs, *Naturwiss.*, 412; 1928.

## Intensity Measurements in the First Positive Bands of Nitrogen

WE have recently measured the intensities of several of the first positive bands of nitrogen, using the method of photographic photometry. As sources, the afterglow of active nitrogen and a high frequency electrodeless discharge in nitrogen at a low pressure have been used. The figures in the second and third columns below are proportional to the energy

Band $\nu'-\nu''$	Intensity		Intensity ratio H.F. discharge/Afterglow
	H.F. discharge	Afterglow	
10-6	294	128	2.30
10-7	245	99	2.48
11-6	68	102	0.67
11-7	300	520	0.58
11-8	159	270	0.59
12-7	74.5	59	1.26
12-8	244	190	1.28
12-9	151	55.5	2.72

radiated per second by the gas due to the various vibrational transitions indicated.

If the probability of a transition occurring between two levels is independent of conditions of excitation, it is evident that the figures in the last column must be constant for bands having a common value of  $\nu'$ . Our results show that this is the case for  $\nu'=10$  and 11, to within 15 per cent, but does not hold for bands having  $\nu'=12$ . There is, however, close superposition of the 4.0 band on the 12.9 band, which would have the effect of increasing the apparent intensity of the 12.9 band. In the afterglow of active nitrogen, the progression having  $\nu'=4$  is very weak, but in the high frequency discharge (and in direct current discharge) it is of appreciable strength. These facts would be sufficient to account for the variation noted in the table.

Preliminary measurements with direct current excitation give results in which the intensity ratio H.F. discharge/D.C. discharge is nearly constant within each progression examined.

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## Influence of Oxygen, Sulphur Dioxide and Moisture on the Homogeneous Combination of Hydrogen with Sulphur

PREVIOUSLY<sup>1</sup>, we have shown that minute traces of oxygen lead to an apparent increase in the rate of formation of hydrogen sulphide from its elements, as judged by the iodine titre of the resulting gaseous products. The increase was ascribed to a catalysis by oxygen, though we pointed out that "the effect of so minute a quantity of oxygen is remarkable and unexpected". The subject has been systematically investigated using hydrogen containing known concentrations of oxygen ranging from 0.06 to 7 per cent by volume, at temperatures between 290° and 343° C. The method adopted, a static one<sup>2</sup>, was carried out in 'Pyrex' bulbs containing quantities of