common easy axes of tetragonal lamellae from one region to another.

If some means of controlling the ordering process could be devised, such that *all* the tetragonal lamellae formed with the same crystallographic orientation with respect to the original disordered cubic lattice, then a single crystal or grain-oriented polycrystal should have properties which approximate closely to those represented by Fig. 7. The $(BH)_{max}$ values should then be considerably raised. This might be achieved by the application of stress during the heat treatment, with due regard to the changes in lattice constants during ordering.

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Platinised Titanium Anodes in Chlorate Production

Since the initial announcement in 1958 by J. B. Cotton, of I.C.I., (1) of the advantages and potential usefulness of a titanium anode having a thin coating of platinum, a great deal of experimental and developmental work has been carried out in many quarters. Although the first application proposed was in cathodic protection, it was very soon apparent that the most important area in which anodes of this type could find a major use was in the electrolysis of brine to produce chlorine or sodium chlorate.

In this field graphite anodes have become established over many years, but they have several disadvantages, including poor conductivity (and therefore massive construction) and gradual erosion, involving periodic adjustment of anode spacing and operation at fairly low temperatures. Metallic anodes thus offered considerable advantages if they could be shown to perform satisfactorily and economically.

Unfortunately, platinum-faced titanium anodes are susceptible to attack by mercury, and they have not therefore been adopted in mercury cathode cells, but in diaphragm cells this problem does not arise and the use of titanium anodes having a thin coating of platinum – or more recently of a 30 per cent iridium-platinum alloy – is likely to become commercial practice in chlorine production in the near future.

In the production of sodium chlorate, however, progress in this direction is rather more rapid. For example, a recent paper from Olin Mathieson (2) describes some earlier development work in the design and operation of first a pilot scale cell and then of a commercial cell using platinum-plated titanium anodes. The thickness of the platinum deposit was 0.00017 inch, and the loss of platinum was 5.3 grams per ton of sodium chlorate, with the expectation that this loss could be reduced with greater control and experience.

A commercial installation recently designed by Krebs et Cie SA for the Finnish manufacturer of paper pulp Oulu Osakeythio to produce 10,000 tons a year of sodium chlorate by the beginning of 1970 is to be equipped with titanium anodes having a 30 per cent iridium-platinum coating. This will permit the use of higher current densities and of a higher working temperature than hitherto, while a very low figure for platinum consumption is expected. Preliminary trials with the Krebs cell showed a loss of 500 mg of alloy per ton of chlorate produced, but experience of two years' operation has led to an estimate of only some 200 mg per ton.

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