EVALUATION OF THE DISTRIBUTION COEFFICIENT OF SILICON IN CADMIUM USING RADIOACTIVE TRACERS

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Irradiated silicon was dissolved in molten cadmium and gradually solidified. The distribution of the radioactive ^{31}Si along the Cd rod was determined by beta-counting. The distribution coefficient K of Si in Cd was calculated from the equation

$$C_x = C_o R[(L-X)/L]^{K-1}$$

where C_x is the Si concentration at distance x from the start of solidification, C_o is the initial average Si concentration, and L is the total length of the Cd rod.

The experimental results are presented in Fig.12. The estimated value for K is 1.9 ± 0.2.

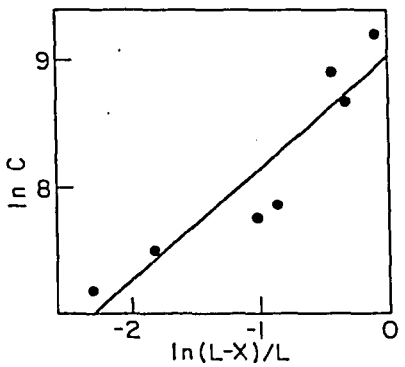

Fig. 12
^{31}Si beta-activity as a function of the distance from the end of the Cd rod

NEODYMIUM ION DISTRIBUTION IN Nd YAG CRYSTALS

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A YAG host crystal is not amenable to uniform Nd^{3+} concentration. This problem arises as a result of the crystal growth mechanism. An accurate analytical method for the determination of Nd^{3+} concentration is therefore required in order to characterize Nd:YAG laser rods.

In the present study two analytical methods were employed: spectrophotometric analysis in the visible range and ICP spectroscopy. Acid disolved Nd:YAG samples were used in order to determine the Nd^{3+} concentration, by the latter method. This enabled us to obtain the Nd^{3+} concentration on an absolute scale with the aid of calibration curves. Results of the ICP spectroscopy measurements were obtained with much higher accuracy than that reported by any other method. These results served as calibrated standards for the other non-destructive analytical methods.