07.1-13 INFLUENCE OF CADMIUM IONS ON THE LINEAR CRYSTAL GROWTH RATE OF POTASSIUM HALIDES: THE SYSTEM KBr-CdBr₂-H₂O. By D. Draganova, R. Kolava, Faculty of Chemistry, Sofia University, 1126 Sofia, Bulgaria.

This report examines the influence of cadmium ions on the growth of potassium bromide crystals on the basis of the R₁₀₀(C) and R₁₁₁(C) curves, where R is the growth rate and C is the impurity concentration. The R-values were measured under stationary conditions by Bliznakov's method. The experimental data at 21°C, shown on Fig. 1, Q/C as well as the data at 25 and 30°C, lead to the conclusion that cadmium ions are adsorbed and incorporated in KBr crystals according to two different mechanisms: I and II.

The mechanism I probably occurs through the adsorption of the complexes CdBr₅⁻ (m<6), which turn into CdBr₄²⁻ in the adlayer and enter the crystal lattice. Estimated from the R(C,T) curves the adsorption heats Q (kcal mol⁻¹) are quite high: Q₁₀₀=Q₁₁₁=14. It seems that these Q-values include additional heat for the complex formation on the crystal surface.

The R(C,T) curves follow the equation of Bliznakov (Fortschr. Min. (1958) 26, 140), which permits the calculation of the surface diffusion activation energy for the adsorbed impurity complexes: 1075 cal for (100) and 720 cal for (111) KBr.

The mechanism II is a result of the formation of two-dimensional adsorption phases. That is why R₁₁₁/R₁₀₀; (Q₁₀₀=8.2; Q₁₁₁=5.1) and this leads to the habit transition (100)→(111) in the C-range of II, according to the relation given by Draganova:

\[ \ln C^X = \text{const} + \frac{Q_{100} + Q_{111}}{2 \times 2.3 R} \]

Here C^X is the C-value, for which R₁₀₀=R₁₁₁ at the corresponding T.

These data seem to give a good explanation of two well known crystallographic phenomena: a) minute impurity traces stimulate the growth of more perfect single crystals - mechanism I with strong passivating effect, but without any change in the R₁₀₀/R₁₁₁ ratio; b) habit modifications always occur at higher C-values. The succession of the action of mechanisms I and II and their different temperature dependence is the reason for the low concentration limits of the impurity habit changing activity.

07.2-01 MULTI-CELL-SIZE LATTICE MODELS APPLIED TO THE INTERPRETATION OF SMALL-ANGLE X-RAY SCATTERING DATA FOR CATALYSTS. By J. Goodisman and H. Brumberger, Dept. of Chemistry, Syracuse University, Syracuse, NY 13210.

Multi-cell-size models, employing spherical or cubic cells with different size distributions to represent the solid catalyst phase, are used to interpret the observed small-angle X-ray scattering of two-phase (void-solid) Al₂O₃ catalysts. Theoretical scattering intensities are calculated from the correlation functions for these models, and the intensities are then numerically smeared for comparison with experimental data taken under "infinite slit" conditions. These models predict the bimodal form of the first moment of the slit-smeared intensity which appears to be appropriate for a number of catalysts.