

**AN INVESTIGATION OF THE EFFECT OF SEED CRYSTAL TYPE AND SOLUTION PURITY ON THE CRYSTAL GROWTH RATE AND DISPERSION OF SUCROSE FROM AQUEOUS ETHANOLIC SOLUTIONS**

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**Abstract**

Crystal growth rate dispersion (GRD) is a phenomenon where seemingly identical crystals in the same solution grow at different rates. It appears to occur to different extents in all crystallization systems, however understanding of why it occurs and what contributes to it is currently very poor. GRD is particularly significant in batch crystallizations, where crystal seeding is most likely to initially produce a narrow crystal size distribution (CSD). Because continuous crystallizers typically have a range of retention times, their CSD is wide even when GRD is not evident, and thus it does not have such a detrimental effect on these crystallizers. This study investigates the effect of solution purity, and seed crystal production method and purity, on the growth rate and growth rate dispersion of sucrose crystals grown from aqueous ethanolic solutions. Both batch and small cell crystallizations were used in the study. The results indicate that impurities in both the solution and the seed crystals significantly reduce the crystal growth rate, with the seed crystal purity having a larger effect. Interestingly, the purity of the seed crystals appeared to have little or no effect on the magnitude of the growth rate dispersion, despite having a significant effect on the growth rate. Impurities in the crystallizing solution do appear to be significant. A solution of around 98 % purity increased the magnitude of GRD by around 30 %.