Today the fluidized bed is used in numerous technical processes. Therefore the appearance of attrition needs to be examined. The present paper deals with a model for the calculation of the reduction of the particle diameter, the total particle surface of all particles in the bed, the weight masses of the bed, the total particle number, the retention time of a particle and the necessary mass flux of particles. In the course of this experimentally determined values of an abrasion coefficient are supposed to be applied. The model represented here makes it possible to replace the lengthy experimental investigation. For this reason investigations were executed under true-to-process conditions in a semitechnical test system with an apparatus diameter of 150 mm. The present paper offers the results of experiments carried out on a self-made granulate in order to determine the change of the distributions of the particle size caused by their use in fluidized beds.

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Effect of Low Stirring Rate on the Attrition of NaCl Crystals in a Mechanically Stirred Crystallizer

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Breakage and attrition are common phenomena in a mixed suspension crystallizer. In this work, the effect of stirring rate (≤ 400 rpm) on attrition and breakage of sodium chloride crystals was studied. Experiments were carried out to determine the crystal size distribution (CSD) resulting from breakage and abrasion occurring in agitated crystal suspensions.. The results obtained are consistent with the available data.

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Yeast Cell Disintegration in the Bead Mill with a Multi-Disk Impeller

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Results of yeast Saccharomyces cerevisiae disintegration in a horizontal mill with a multi-disk impeller are discussed. The variable parameters were the concentration of microorganism suspension (0.05–0.20 g d.m./ml) and rotational speed of the impeller (1000–3500 rpm). The degree of disintegration was determined on the basis of absorbency measurements at the wavelength 260 nm. The process kinetics was investigated by two integrated meth-

ods. Experimental values of the maximum absorbency were compared with theoretical data obtained as a result of searching for the highest values of the correlation coefficient between variables t and $\ln[A_m/(A_m-A)]$. A significant increase of the process rate constant with an increasing suspension concentration was observed The hypothesis of an additional disintegration mechanism was modified taking that it was a result of the action of cell wall fragments on destroyed microorganisms.

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Effects of Additives on Crystal Growth Rates: Case Study MgSO$_4 \cdot$ 7H$_2$O

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The influence of different additives on the crystallization kinetics of Epsomite (MgSO$_4 \cdot$ 7H$_2$O) has been investigated in a fluidized bed crystallizer. For detection of changes in the metastable zone width, an ultrasonic technique has been used. In the experiments the supersaturation (0.2 – 2 K) as well as the impurity concentration (1 – 5 wt%) have been varied.

The growth rate of Epsomite crystals is related to the width of the metastable zone and supersaturation. The effects of the examined additives (Magnesium Chloride, Potassium Chloride and Potassium Sulfate) can be divided into thermodynamic effects and kinetic effects. In the first case the impurities exert influence on the saturation and supersaturation limit whereas in the latter case the crystal growth is being suppressed.

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Stability and Flocculation of Zeolites in Sols and Suspensions

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Many catalyst shaping procedures such as spray drying or extrusion involve aggregation of zeolite crystals with particles of the binder matrix in the liquid phase. A better control of these processes should result in catalyst bodies with improved diffusional and mechanical properties. We have studied the attractive and repulsive forces between zeolite crystals in aqueous sols and suspensions by monitoring the zeta potential and the mean aggregate size at varying pH values. Effects of zeolite structure (MFI, OFF, *BEA), crystal size (60 nm to 3500 nm), amount of framework aluminum (Si/Al-ratio ranging from 5 to >2000) as well as the influence of template on the isoelectric point and the aggregation behaviour are discussed.