

Chapter VI

Conclusions

6.1 Conclusion

1. The effect of grinding time and weight ratio of grinding media and feldspar on size distribution, flowability and particle shape of ground feldspar in vibration mill are investigated experimentally in this work.

2. Under various comminution conditions, ground product probably has the same average size but different flowability. This result was predicted to be an effect of particle shape of ground product. Therefore further investigation of effect of both operating parameters on the particle shape of ground feldspar was carried out.

3. Regarding the grinding time effect, the higher grinding time led to the worse the flowability of ground feldspar. This result is in good agreement with that reported by Paramasivan (1993). When consider the ground feldspar in each sizes range, the effect of grinding time on the flowability can not be clearly discussed.

4. The higher the grinding time, the higher the shape irregularity ,which is implied from the higher fractal dimension. However, this effect depends upon the sizes range of ground feldspar.

5. Regarding the effect of the weight ratio between media and feldspar on the flowability, in the case of vibration mill, there are the optimum weight ratio which results in ground product with the highest flowability regardless of the size range of ground product.

6. The trend of the effect of weight ratio of media and feldspar on fractal dimension and flowability of the ground product are found to be in good agreement. In this study, at weight ratio of media and feldspar 4:1, the ground product shows minimum fractal dimension and maximum flowability in each sizes range. Therefore, it can be concluded that the particle shape of the ground product affect its flowability.

7. The correlations between fractal dimension (D) and flowability of the ground feldspar in each size range are determined from experimental data and expressed as

$$\text{Size 149-210 micron} \quad y = -235.10x + 326.73 \quad \text{for } 1.042 \leq x \leq 1.064$$

$$\text{Size 210-297 micron} \quad y = -52.57x + 140.14 \quad \text{for } 1.048 \leq x \leq 1.076$$

$$\text{Size 297-420 micron} \quad y = -224.73x + 315.82 \quad \text{for } 1.035 \leq x \leq 1.055$$

where y is the flowability of ground product and x is its average fractal dimension.

8. Taking use of analysis of variance, the author found that data of fractal dimension of each ground feldspar is different from that of other with 90 percent of degree of confident.

6.2 Recommendations for future study

Since the flowability is an important factor for indicating the difficulty of transportation of powder whereas the particle shape is also one factor which affects the flowability property of product, it will be interesting to extend the present study to collect more data on its correlation. There also are other points that should be investigated, such as comminution in wet system, addition of additives, the type of mill and so on. In addition, comminution samples should be tested to investigated the effect of comminution conditions on other properties such as the tensile strength and so on.