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Borra, Chenna; Vlugt, Thijs; Offerman, Erik; Yang, Yongxiang

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Characterisation of glass polishing waste samples

C.R. Borra¹, T.J.H. Vlugt¹, S.E. Offerman¹ and Y. Yang¹ ¹ 3ME Faculty, Delft University of Technology, Delft, The Netherlands



Abstract

The present work describes the characterisation of the two different polishing waste samples. The samples were analysed with laser particle size analyser, XRD, XRF, TGA, and SEM. In the sample A, a large amount of calcite (CaCO₃) together with silica and alumino-silicates were observed with SEM. In the minerology, only CaCO₃, CeO₂ and LnO_{0.65}F_{1.7} were found. In the sample B, very small amounts of impurities (<2%) were found. The particle size of sample B was decreased compared to it's original polishing powder. CeO₂ and LnO_{0.65}F_{1.7} compounds were found in the XRD analysis.

Introduction

Ceria is the principal compound in glass polishing powder because of its chemical and mechanical properties. After several cycles of polishing, this powder either enriches with impurities (glass, flocculants etc.) or changes its particle size distribution. Hence, it can't be further used due to poor polishing properties and ends up in landfills. The present work describes the characterisation of the two different polishing waste samples, which will help in designing the subsequent recovery processes.

Methods and Materials

- Two glass polishing waste samples
- XRF Chemical analysis
- TGA Thermal analysis
- XRD Mineralogy
- SEM Morphology and mineralogy
- LD Particle size distribution

Results and Discussion





Conclusions

- Sample B contains very less impurities where sample A contains high amount of impurities.
- Sample B contains compounds of CeO₂, LaO_{0.65}F_{1.7} and LaPO₄.
- Sample A contains compounds of CeO₂, CaCO₃, LaO_{0.65}F_{1.7} and LaPO₄ together with silica and alumino-silicates
- > Sample B is fine material compared to sample A

References

- Borra, C.R., Vlught, T.J.H., Offerman, S.E., Yang, Y. 2017. A brief review on recovery of cerium from glass Polishing waste. In: Proc. of the 7th Slag Valorization Symposium. Leuven, Belgium, 3-5 April 2017.
- K. Kato, T. Yoshioka, A. Okuwaki, 2000. Study for Recycling of Ceria-Based Glass Polishing Powder: Industrial & Engineering Chemistry Research, 39 (4), 943–947.