

Delft University of Technology

Characterisation of glass polishing waste samples

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

Publication date 2017 **Document Version** Final published version

Citation (APA)

Borra, C., Vlugt, T., Offerman, E., & Yang, Y. (2017). *Characterisation of glass polishing waste samples*. Poster session presented at ERES 2017: 2nd European Rare Earth Resources Conference, Santorini, Greece.

Important note

To cite this publication, please use the final published version (if applicable). Please check the document version above.

Copyright Other than for strictly personal use, it is not permitted to download, forward or distribute the text or part of it, without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license such as Creative Commons.

Takedown policy

Please contact us and provide details if you believe this document breaches copyrights. We will remove access to the work immediately and investigate your claim.

This work is downloaded from Delft University of Technology For technical reasons the number of authors shown on this cover page is limited to a maximum of 10.

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.

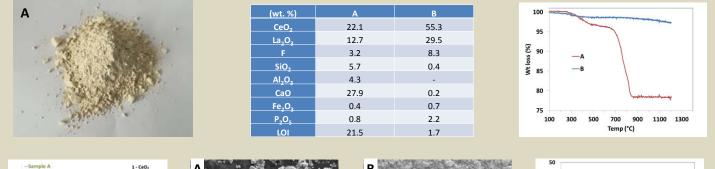
Introduction

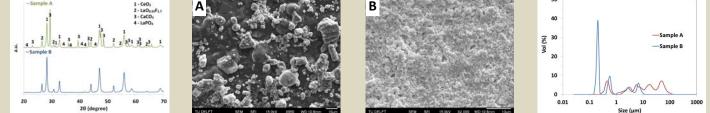
Ceria is the principal compound in glass polishing powder because of its chemical and mechanical properties. After several cycles of polishing, this powder either enriches with impurities (glass, flocculants etc.) or changes its particle size distribution. Hence, it can't be further used due to poor 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.