



“EURARE: Development of a sustainable exploitation scheme for Europe’s REE ore deposits”

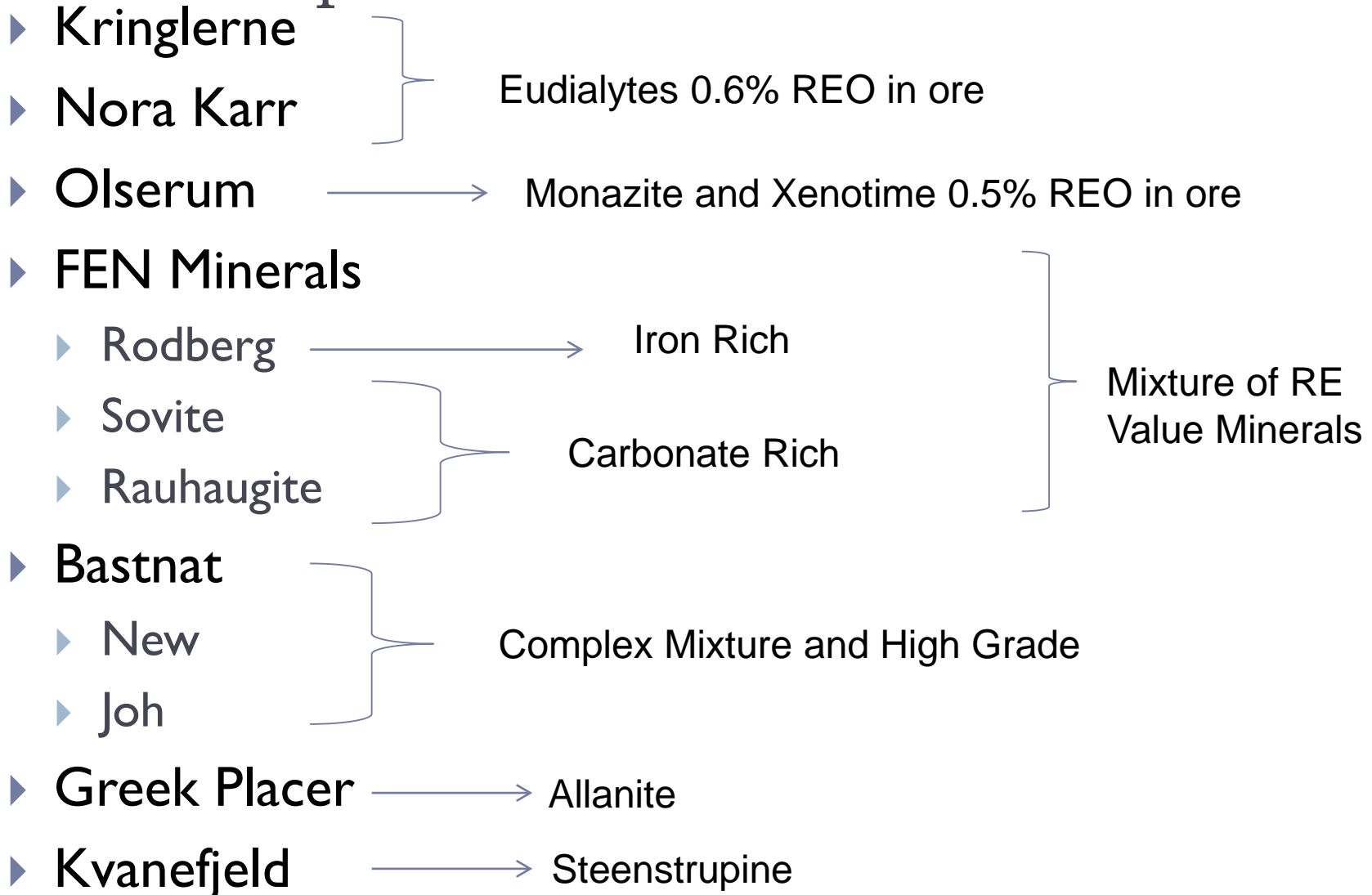
WP2: What Have We Learnt

EURARE 5th Progress Meeting / Aachen 4.12. 2015

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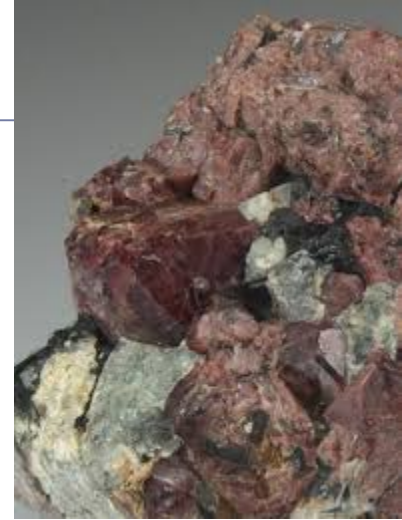


All the Deposits Tested



Kringlerne – Greenland

- ▶ Low grade and very large deposit
- ▶ Value Mineral is Eudialyte
 - ▶ Measured pure mineral assay of ~3% (Variable)
- ▶ Coarse grain size allows for physical separation of value mineral
- ▶ Different Magnetic Properties of the minerals
 - ▶ Non-magnetics, paramagnetics and Ferromagnetics
- ▶ 1.5% REO concentrate at ~70% Recovery
 - ▶ Done at bench scale only in EURARE
 - ▶ Significant Zr content just as valuable as REE
- ▶ Tanbreez will be contributing conc to MEAB Demo Plant



Nora Karr – Sweden

- ▶ Low grade ~0.6% with 50% HREO!
- ▶ Value Mineral is Eudialyte
 - ▶ Measured pure mineral assay of ~6% (Variable)
- ▶ Coarse grain size allows for physical separation of value mineral
- ▶ Different Magnetic Properties of the minerals
 - ▶ Non-magnetics, paramagnetics and Ferromagnetics
- ▶ 1.5% REO concentrate at >70% Recovery
 - ▶ Done at bench and pilot scale in EURARE
 - ▶ Significant Zr content just as valuable as REE
- ▶ MEAB Demo Plant on concentrate next year



Oleserum– Sweden

- ▶ Low grade ~0.6% with 36% HREO
- ▶ Value Minerals are Monazite Xenotime
 - ▶ Pure mineral assay of ~40% (Variable)
- ▶ Medium grain size suitable for flotation
- ▶ Monazite and Xentime float performance understood
- ▶ 20% REO concentrate at ~70% Recovery
 - ▶ Done at bench in EURARE
 - ▶ First done successfully with EURARE
- ▶ Still an exploration project with some potential



Rodberg – Norway

- ▶ **Medium Grade ~1.5% and high Th (1%)**
 - ▶ 96% LREO proportion
- ▶ **High Iron ore**
 - ▶ Finely disseminated variety of rare earth minerals
- ▶ **Fine grain size of REO minerals**
 - ▶ Makes beneficiation difficult
- ▶ **Smelting of the ore effective**
 - ▶ Concentrates the REO into the slag
- ▶ **Mild Atmospheric Leaching Effective**
 - ▶ Some selectivity for REE over gangue elements
- ▶ **Atmospheric Leaching Process to be developed**



Sovite – Norway, FEN

- ▶ V Low grade ~0.2%
 - ▶ 88% LREO proportion
- ▶ Very High Carbonate Content
 - ▶ Finely disseminated variety of rare earth minerals...again.
 - ▶ Apatite present
- ▶ Fine grain size of REO minerals
 - ▶ Makes beneficiation difficult
- ▶ Beneficiation effective for apatite only
 - ▶ Direct leaching most suitable
- ▶ Still an exploration project
- ▶ Possible application as neutralising agent or fertilizer



Rauhaugite – Norway, FEN

- ▶ Medium grade ~1.5%
 - ▶ 88% LREO proportion
- ▶ High Carbonate Content
 - ▶ Variety of REE minerals
 - ▶ Finely disseminated variety of rare earth minerals...still.
- ▶ Fine grain size of REO minerals
 - ▶ Makes beneficiation difficult
- ▶ Whole of ore treatment
 - ▶ Direct leaching may be suitable
- ▶ Still an exploration stage ore deposit



Bastnas – Sweden

- ▶ High Grade Ore ~15% REO
 - ▶ 95% LREO proportion
- ▶ Mixture of Minerals
 - ▶ Variety of REE minerals
 - ▶ Coarse minerals
- ▶ Good potential for beneficiation
 - ▶ Due to coarse grain size
- ▶ Refractory Minerals
 - ▶ Diversity and tough nature will make hydromet treatment difficult
- ▶ Interesting exploration opportunity



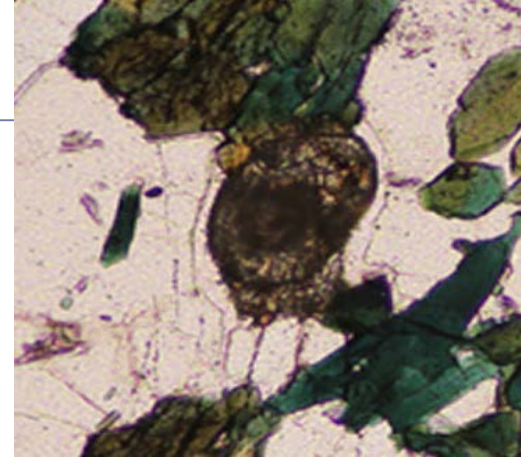
Greek Placer – Greece

- ▶ V Low Grade 90% LREO proportion
- ▶ Allanite the major mineral
 - ▶ Already liberated as sand grain
- ▶ Good potential for beneficiation
 - ▶ Due to coarse grain size
- ▶ Good work initial beneficiation work performed
 - ▶ 80% of REO into 20% of the mass
 - ▶ 1.5% REO concentrate grade achieved
 - ▶ Possible pre-concentration step
 - ▶ Tailings are likely very benign
- ▶ Examine flotation to further increase grade
 - ▶ High cost refining likely



Kvanefjeld – Greenland

- ▶ Medium grade (1.3%) 85% LREO proportion
- ▶ Steenstrupine the major mineral
 - ▶ Britholite, monzite, townendite
- ▶ Medium coarse grain size
 - ▶ Well suited to beneficiation
- ▶ Extensive work performed (including EURARE)
 - ▶ 80% of REO into 7% of the mass
 - ▶ 15% REO concentrate grade achieved
 - ▶ Piloted 3 times
 - ▶ Feasibility Study Design Complete
- ▶ Beneficiation and Refinery Demo Plants Complete
 - ▶ Separation through MEAB next





Thanks for your
Attention

