

Presentation



Mineralogical Influence on Leaching Behaviour of Steelmaking Slags

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Background - Steel Slags

Sweden

2008: 1.3 million tonnes slag

External use: ~ 35 %

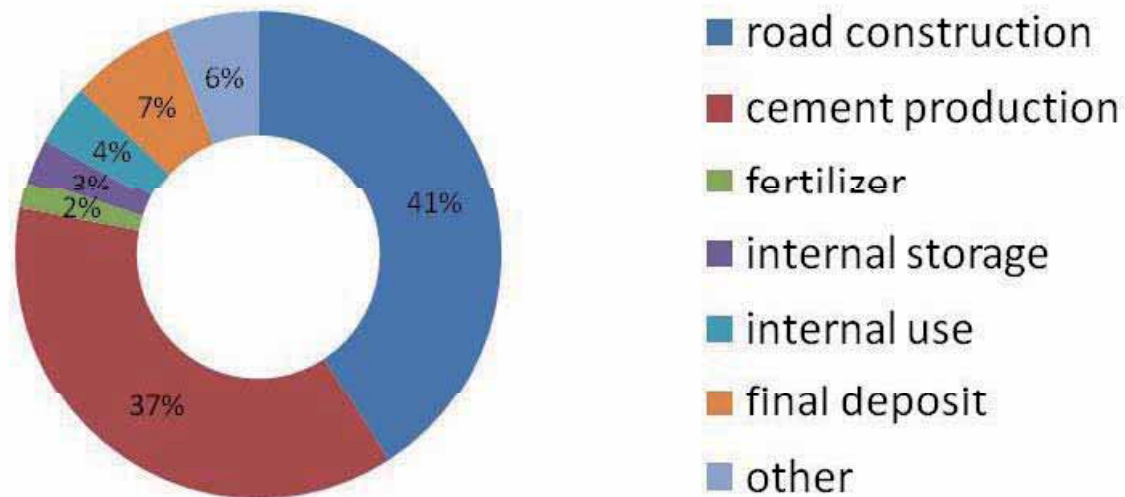
Landfilling: ~ 20 %

Europe

2006: ~ 45 million tonnes slag

External use: ~ 80 %

Europe



Conditions in Sweden

- 35 million tonne virgin material used in construction annually

- Good access to high quality natural stone material

- Criteria for use in building applications and road construction are missing for these materials
- High availability of land for land filling
- “Fear” of using by-products

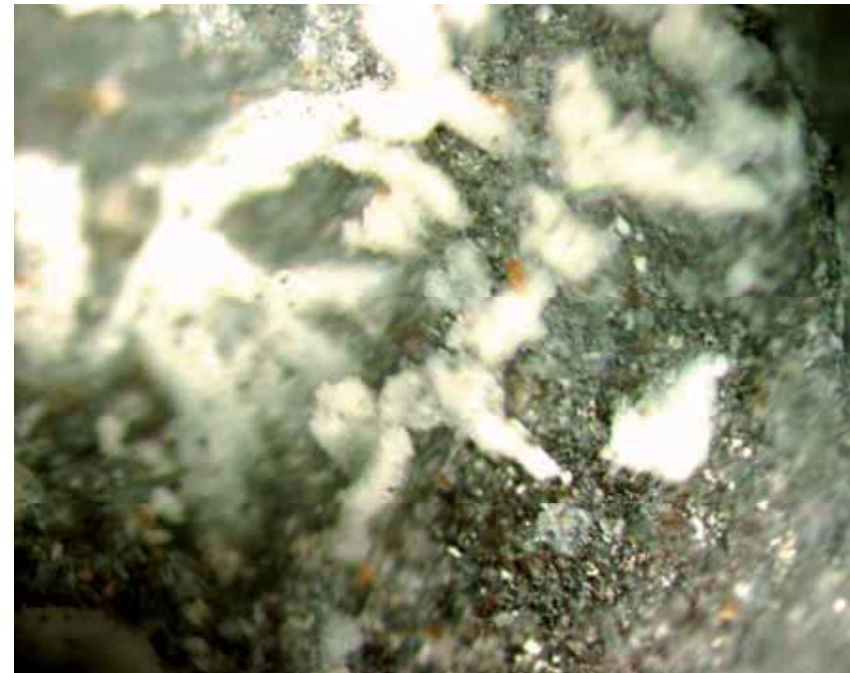


Obstacle



for use in external applications

- Leaching of metals
- Volume expansion
- Disintegration



Aim and Factors Investigated

AIM: Linking leaching properties with process parameters

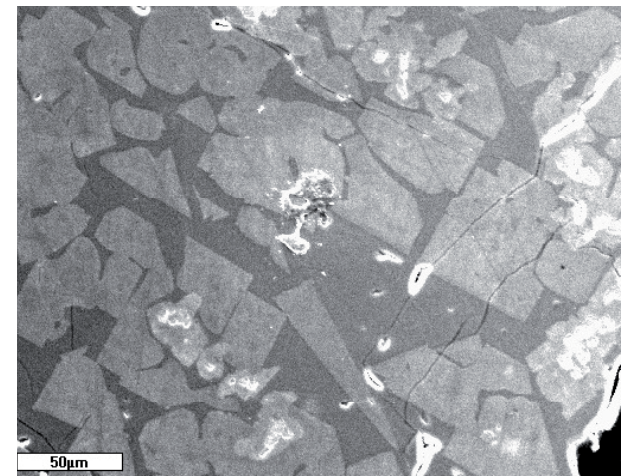
Factors investigated!

- Possibilities of modifying in hot stage
- Influence of cooling
- Influence of ageing

Multi-crystalline material!

Formulation of hypothesis

Do different slag minerals dissolve differently?



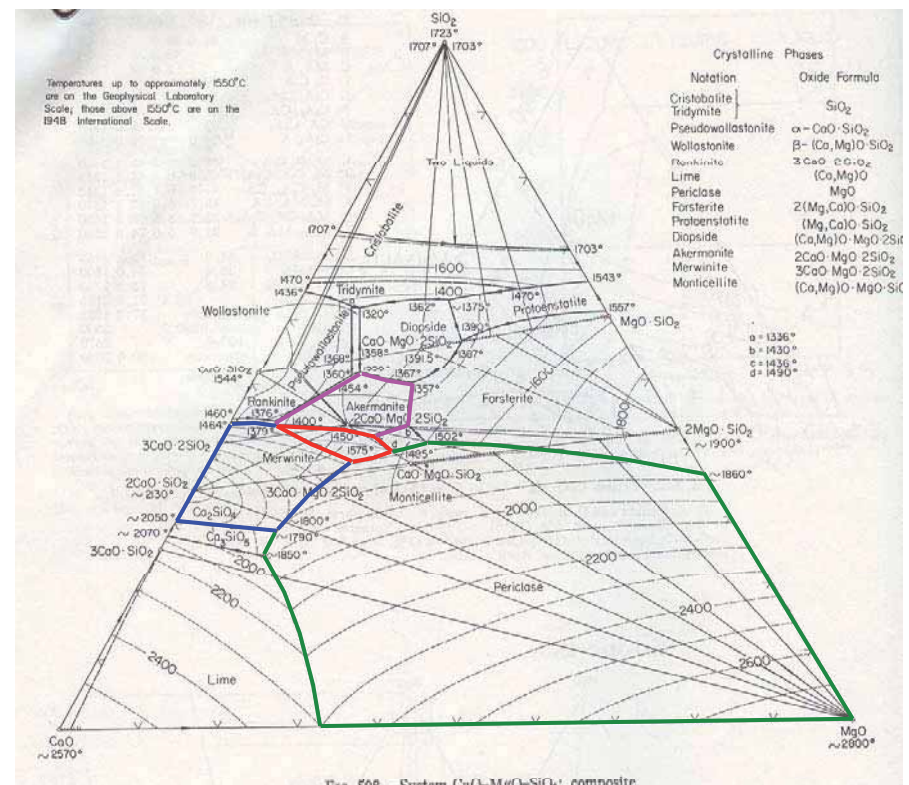
The hypothesis, P (V)



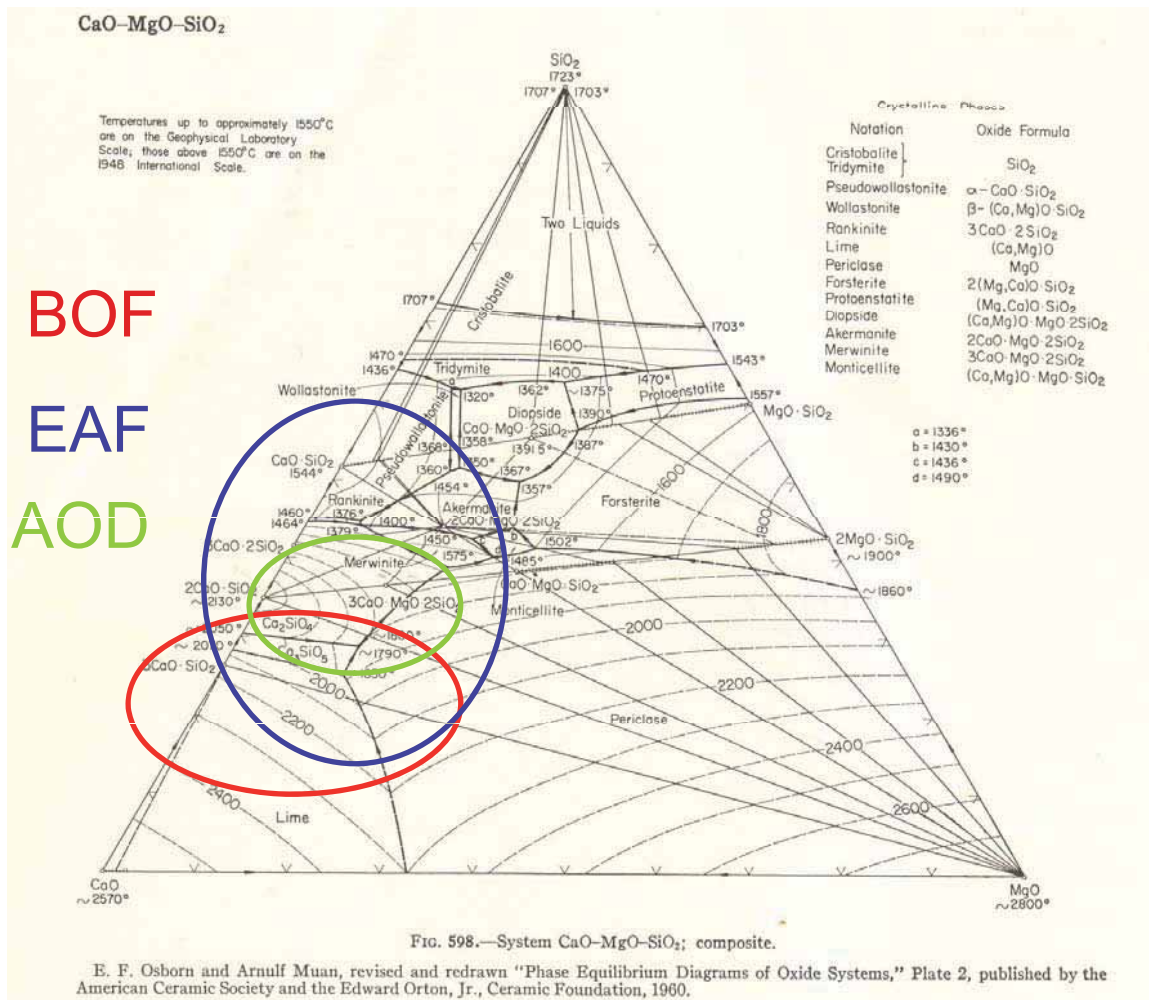
If different slag minerals dissolved differently how will that influence the leaching of a specific metal?
 Could it be an explanation why the leaching is not following chemical composition? Example Cr!

Dissolves chromium

Merwinite	Yes
Akermanite	No
γ - Ca_2SiO_4	No
MgO	Yes
Gehlenit	No
$\text{Ca}_2\text{Fe}_2\text{O}_5$	Yes
$3\text{CaO} \cdot \text{Al}_2\text{O}_3$	No



Syntheses of slag minerals, P (V)



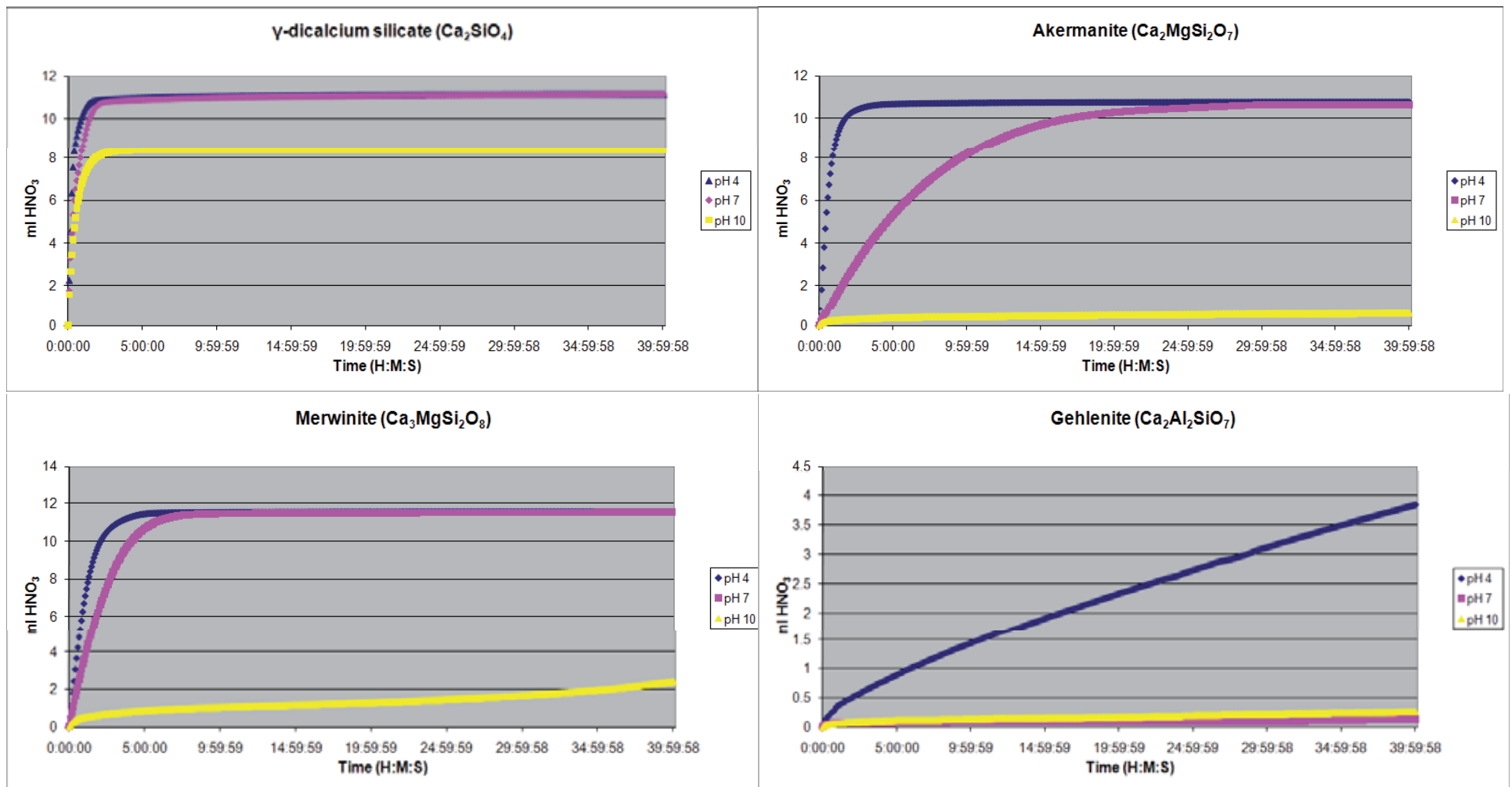
Six common slag minerals!

- Mayenite $\text{Ca}_{12}\text{Al}_{14}\text{O}_{33}$
- Merwinite $\text{Ca}_3\text{MgSi}_2\text{O}_8$
- Akermanite $\text{Ca}_2\text{MgSi}_2\text{O}_7$
- Gehlenite $\text{Ca}_2\text{Al}_2\text{SiO}_7$
- Ingesonite $\gamma\text{-Ca}_2\text{SiO}_4$
- Tricalcium alum. $\text{Ca}_3\text{Al}_2\text{O}_6$



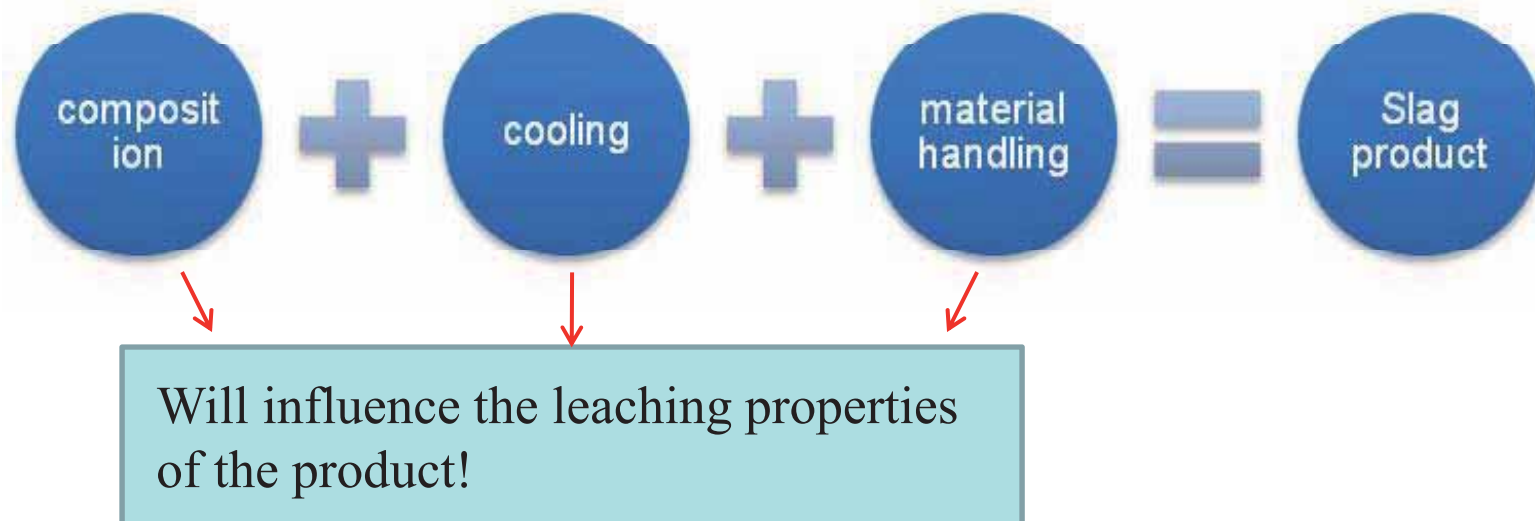
Synthetic slag minerals/titration, P (V)

20-38 μm size fraction, 0.1 M HNO_3 , 50 mg mineral / 100 ml H_2O



Conclusions / Parameters effecting slag product

AIM: Linking the leaching properties with variations in process parameters!



Acknowledgement



MiMeR
Minerals and Metals Recycling Research Centre



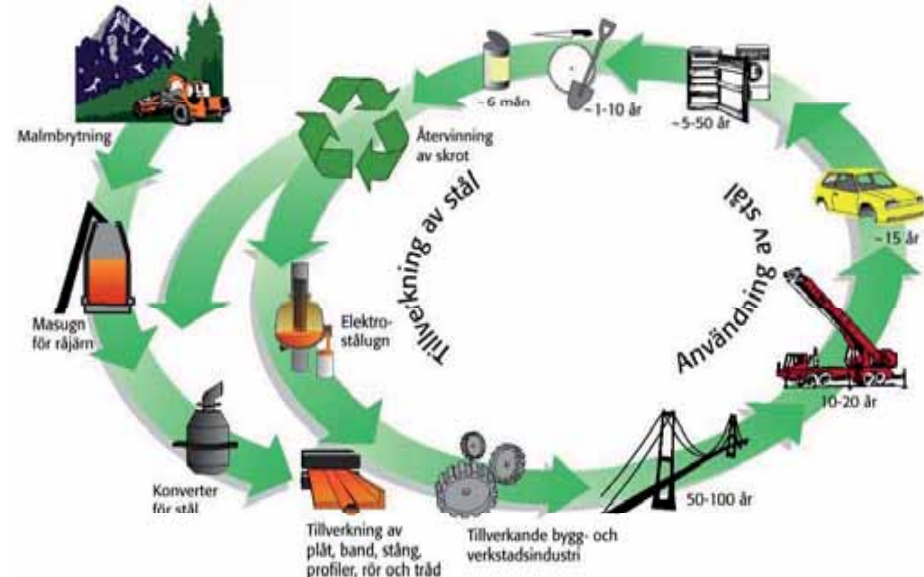
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