



Comparison of mobility changing of elements during the pretreatment of the geopolymer raw materials

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Aim of this Study

- Follow the mineral transformations during the geopolymer production
 - Instrumental methods: TG, IR, XRD, NMR, XPS, others
 - Sequential extraction: the elements in different chemical environment have different solubility.

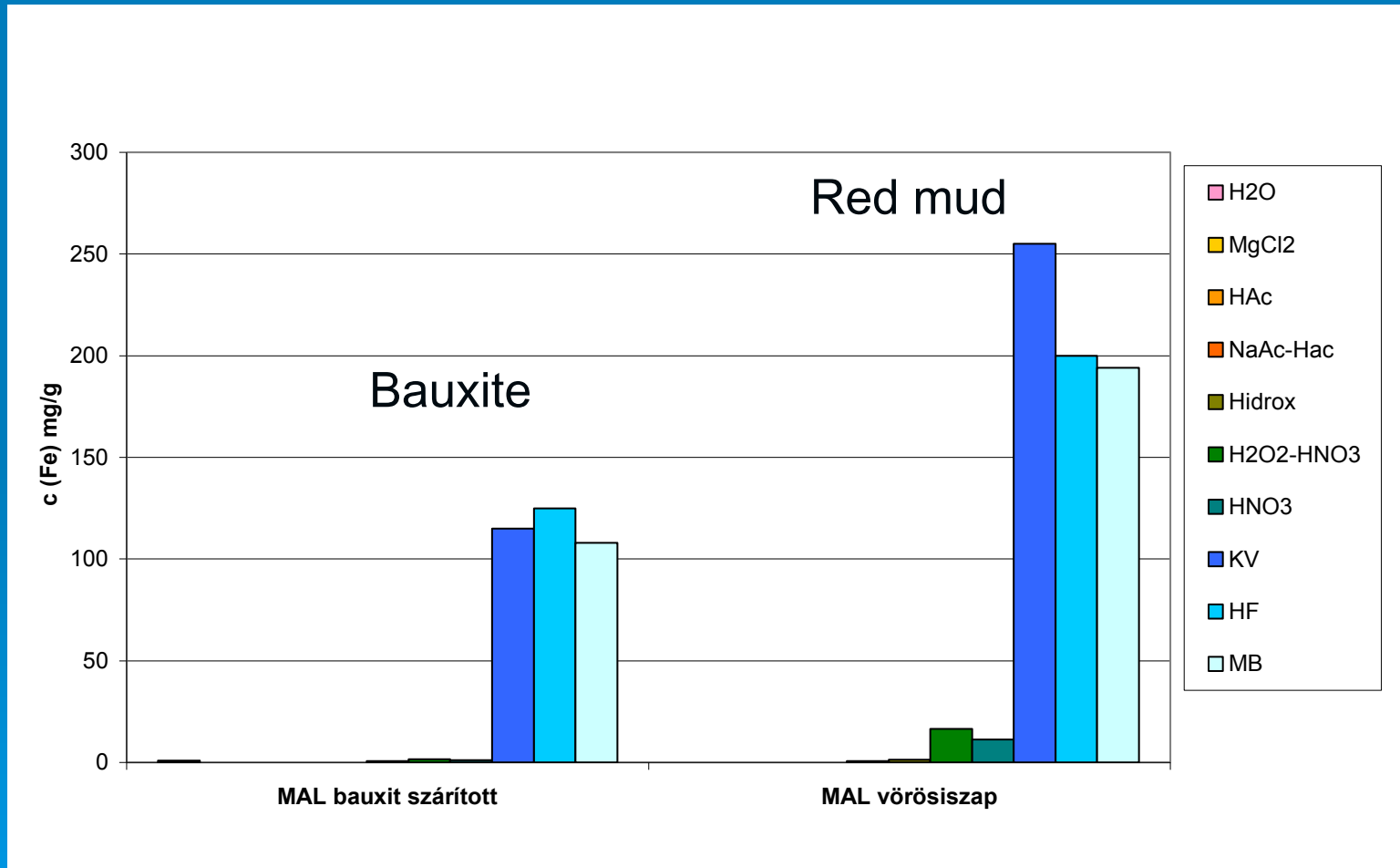
Sequential extraction

- Generally used for determination of the environmental risk if the waste disposed to the environment
- Rarely used for hydrometallurgy to find the suitable process for extract the valuable component (planning suitable recycling technologies)
- Analytical tool for determination of mineral transformation during treatment and hydrometallurgical process.

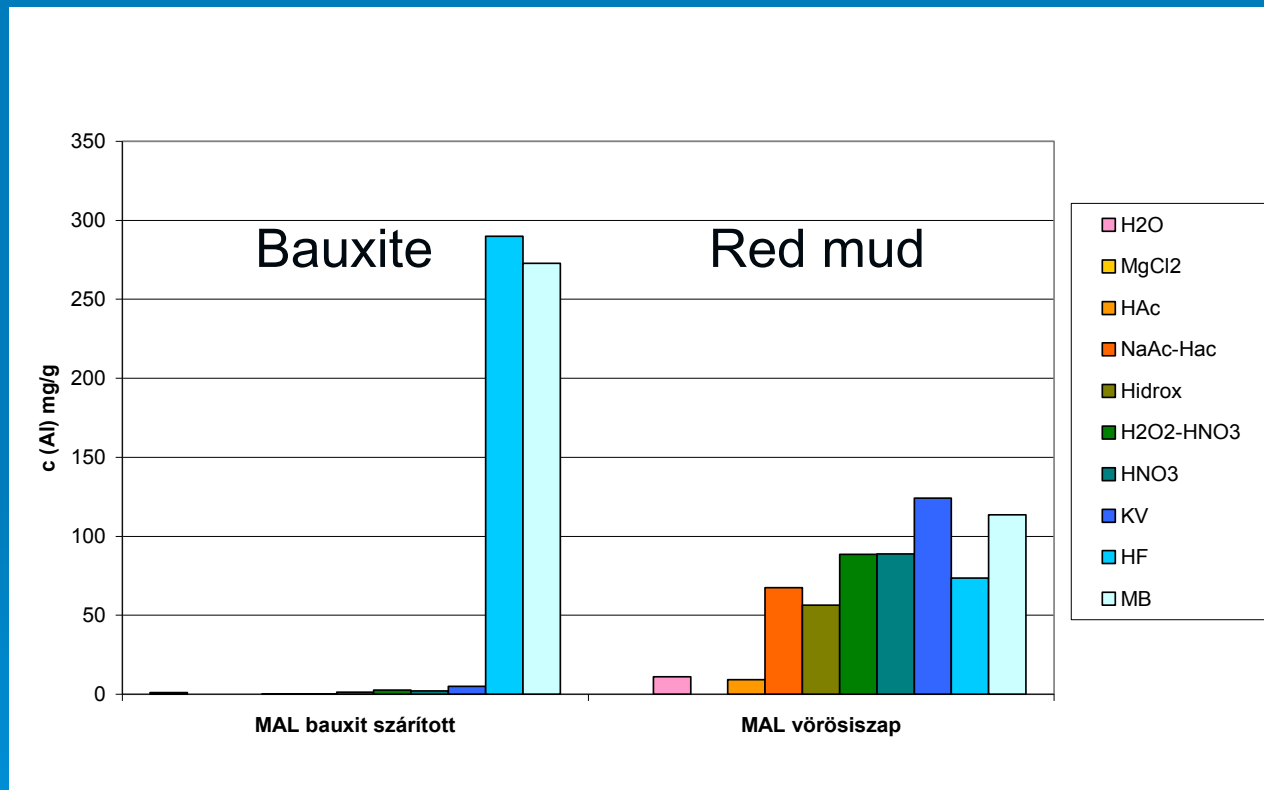
Sequential extraction

No of steps	Type of solvent	Type of mobilised ion
1	Distilled water	Water soluble
2	1 mol/l Magnesium-chloride 1 M MgCl ₂	1 + ion-exchangeable
3	1 mol/l Acetic acid (1 M HAc)	2. + weak acid soluble (carbonate, etc)
4	0,1 mol/l Hidroxil-amin-hidrochloride 1 mol/l acetic-acid (NH ₂ OH-1M HAc)	3. + mobilisable by reduction
5	20 m/m% Hydrogen-peroxide 1 mol/l nitric acid (H ₂ O ₂ -HNO ₃)	4.lépés + mobilisable by oxidation
6	Aqua regia 3 V cc.HCl + 1Vcc HNO ₃ (AuaR)	Total mobilisable in environmentally concern
7	HF-HClO ₄ -es dissolution (HF)	5 + szilikát loaded
8	Dissolution after Lítium-metaborate digestion (LiBO ₂)	Total

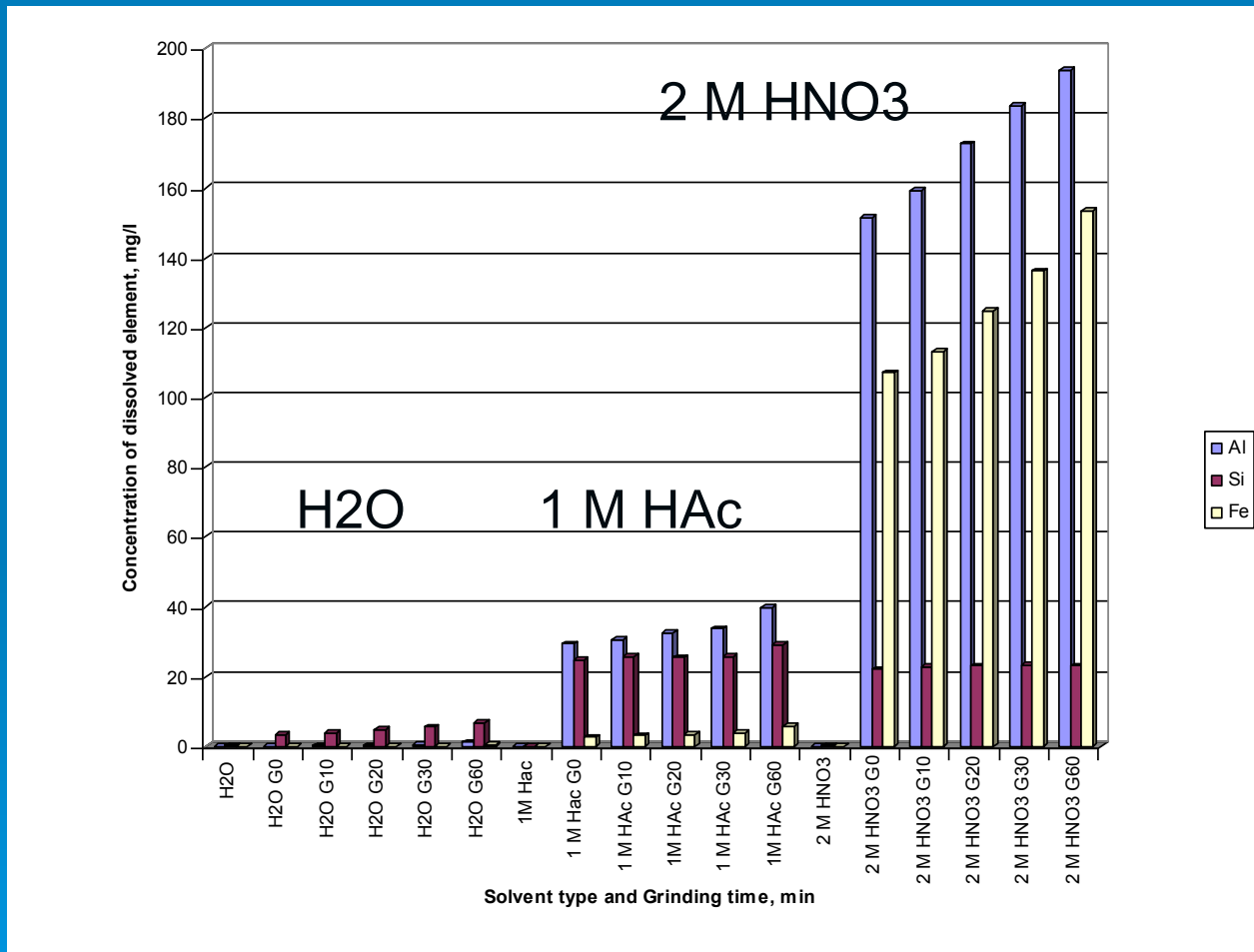
Solubility of Fe in bauxite and red mud (Sequential extraction)



Solubility of Al in bauxite and red mud (Sequential extraction)

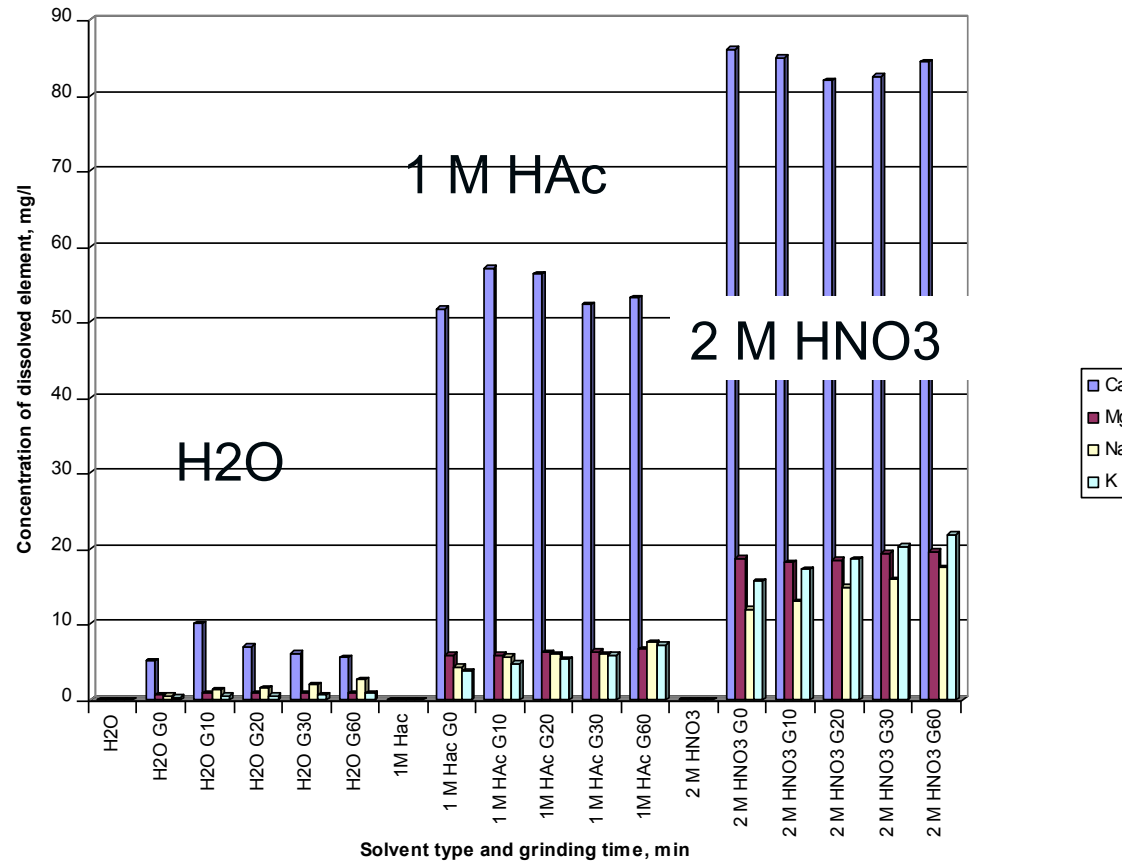


Effect of grinding on Al, Si, Fe solubility



Accessibility or mineral transformation?

Effect of grinding on Ca, Mg, Na, K solubility

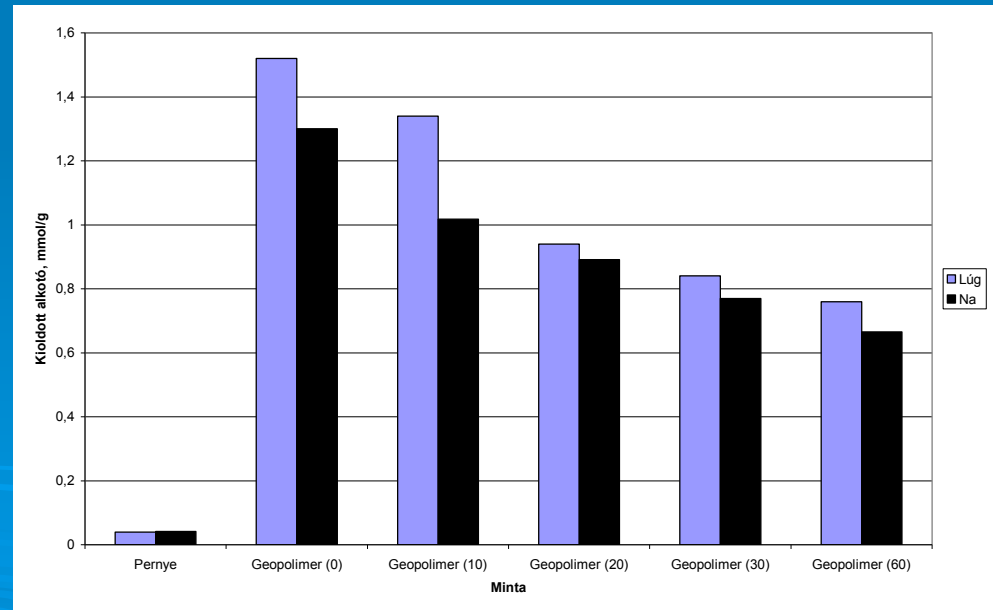


Shell is porous?

Conclusion

- The sequential extraction seems a useful tool for study the mineral transformation during geopolymer production.
- Element mobility changeing after geopolymer production???

Soluble alkaline componens from geopolymers in function of grinding time



Acknowledgement

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➤ Thank you for your attention.

