

# Cs and Sr adsorption capabilities of Clinoptilolite

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# Introduction

- ▶ Zeolite is well known for absorption properties
- ▶ Porous aluminosilicate mineral with many different structures
- ▶ Many applications in agricultural industry
- ▶ Due to regular pore structure they are very selective for cations (molecular sieves)
- ▶ Selectivity is due to specific mineral

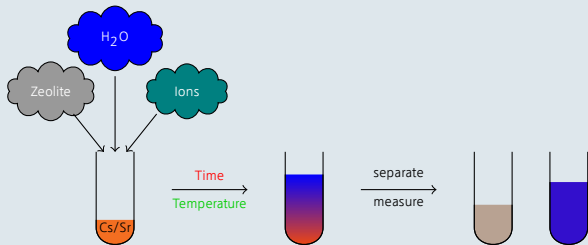
# Samples

Four samples were provided, three from Lithos Natural GmbH, one external:

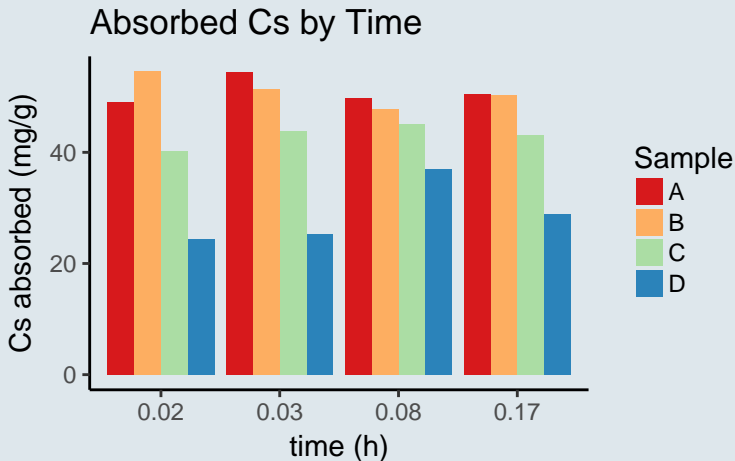
Sample	Name	grainsize	clinoptilolite
A	LithoFill™100 T	0-125 µm	90%
B	LithoFill™100	0-100 µm	90%
C	LithoGran™2	0.5-2 mm	90%
D	External	0-125 µm	<60%

Check for specific adsorption capabilities for Cs and Sr?

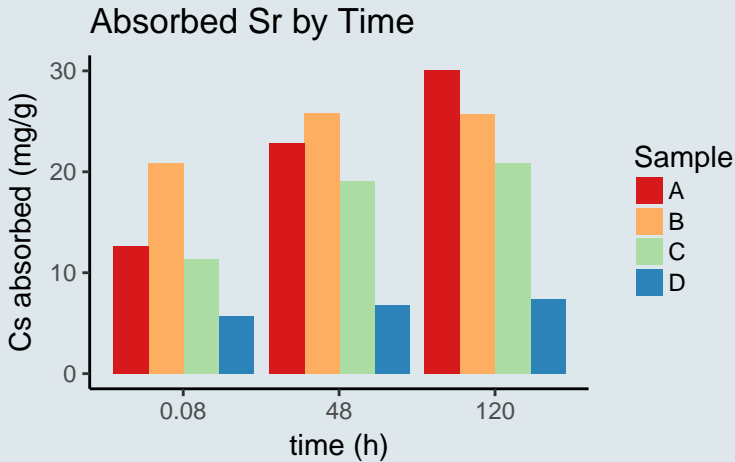
# Testing adsorption capabilities



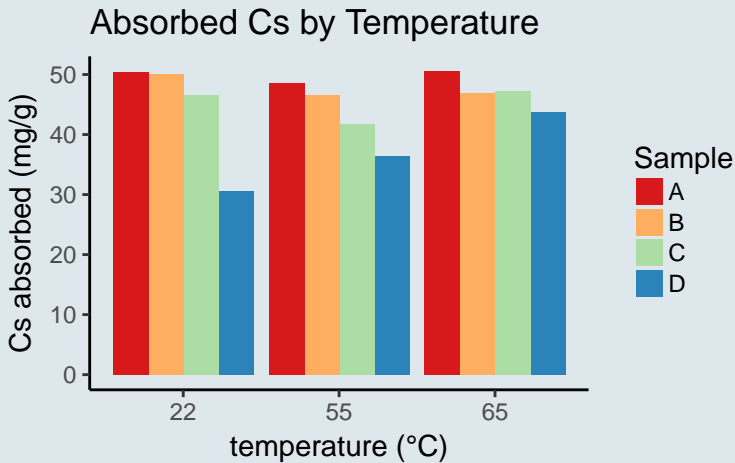
## Time dependence



## Time dependence

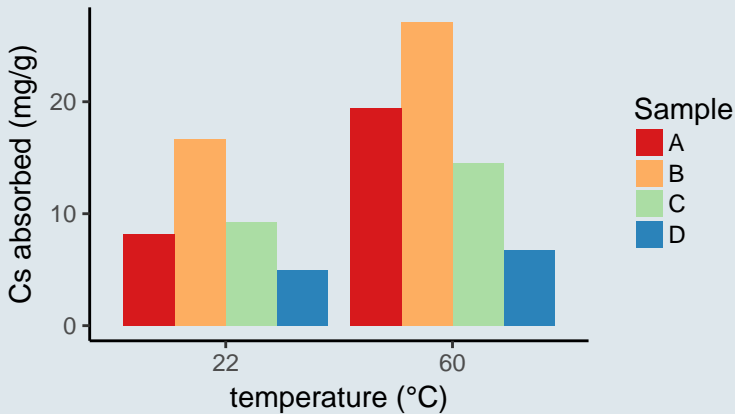


## Temperature dependance



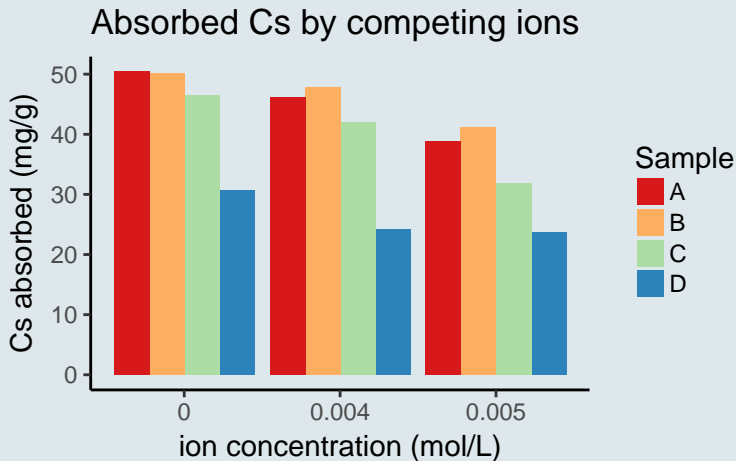
## Temperature dependance

Absorbed Sr by Temperature (5 mins)



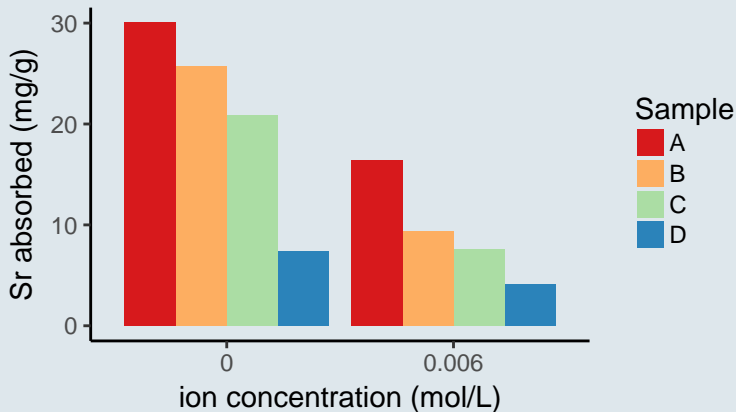


## Competing Ions



## Competing Ions

Absorbed Sr by competing ions (120 hours)



# Conclusion

- ▶ **Sample A** and **B** are very similar
- ▶ Difference to **Sample C** is mainly in grain size.
- ▶ **Sample D** is markedly less absorbent for Cs and Sr
- ▶ Very high specific selectivity for Cs<sup>+</sup>:
  - ▶ High speed of absorption
  - ▶ Low influence of competing ions
  - ▶ Low temperature dependency
- ▶ Absorption for Sr<sup>2+</sup> roughly half of Cs<sup>+</sup>
  - ▶ Adsorption for Sr much slower
  - ▶ Competing ions have more influence
  - ▶ Temperature has much more influence

# Outlook

A few questions are still open:

- ▶ Have we reached maximum adsorption capability for Cs?
- ▶ Higher and different concentrations of competing ions?
- ▶ Adsorption kinetics for  $\text{Sr}^{2+}$ ?

# Thank you!

