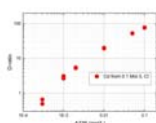


Status report spring 2016

Hans Vigeland Lerum
Department of Chemistry
UIO
14.06.2016



Outline of my presentation



Methods used

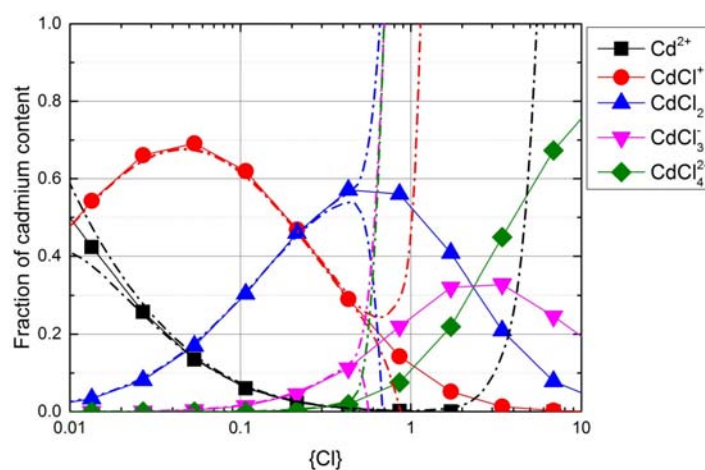


Courses



Conferences
Papers

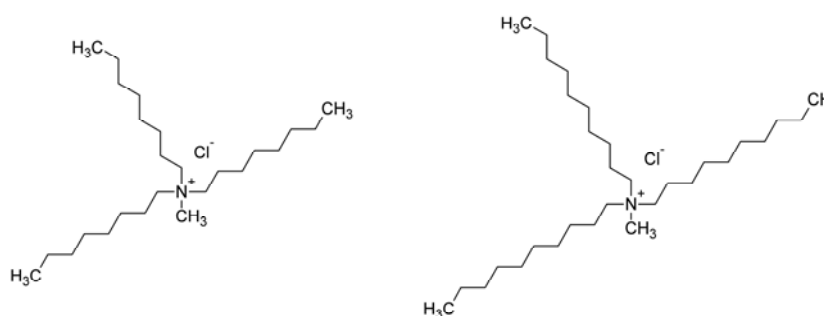
Prediction ion behavior in highly saline environment is difficult



(1) Kipton J. Powell, P. L. B., Robert H. Byrne, Tamas Gajda, Glenn Hefter, Ann-kathrin Leuz, Staffan Sjöberg, Hans Wanner. Chemical Speciation of Environmental Significant metals with inorganic Ligands. Part 4 : The Cd²⁺ + OH⁻, Cl⁻, CO₃²⁻, and PO₄³⁻ Systems (IUPAC Technical Report). *Pure and applied chemistry* 2011, 83 (5), 1163.

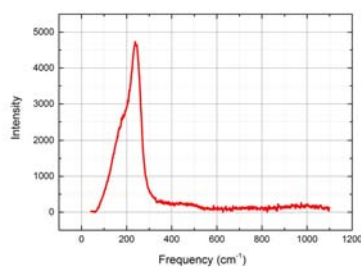
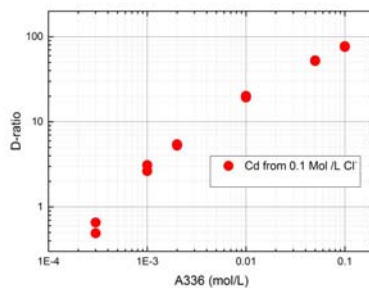
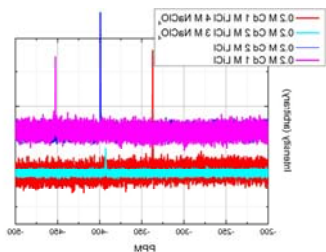
3

Aliquat is dominated by these two molecules with a slight difference in chain length



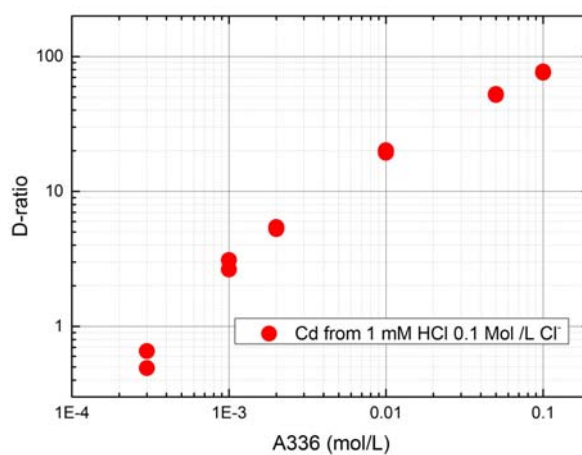
4

There are several methods that we have decided to use in this project



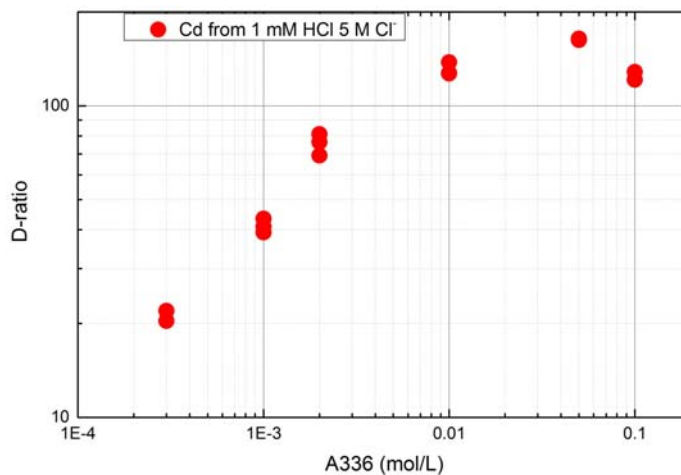
5

Cadmium extracted into toluene using aliquat 336, aqueous phase was 0.1 mM Cd 1 mM HCl and 0.1 Mol/L



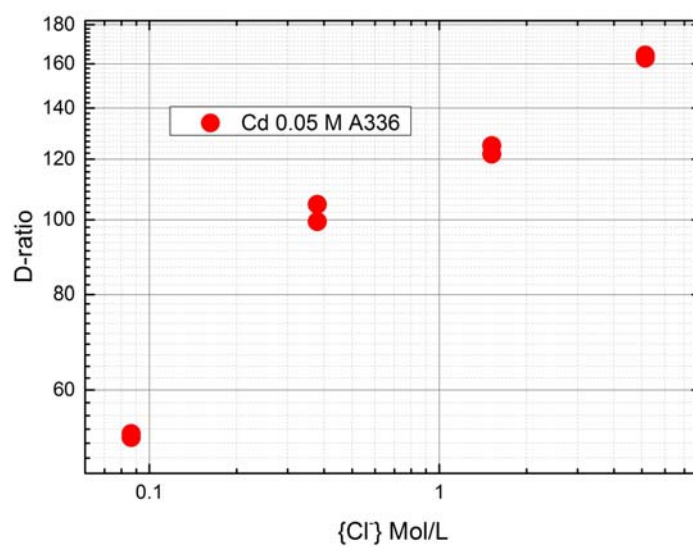
6

Cadmium extracted into toluene using aliquat 336, aqueous phase was 0.1 mM Cd 1 mM HCl and 5 Mol/L



7

Cadmium extracted into toluene using 0.05 M aliquat 336, aqueous phase was 0.1 mM Cd 1 mM HCl



8

Pros and cons of liquid-liquid extraction

Can handle a high range of different solutions

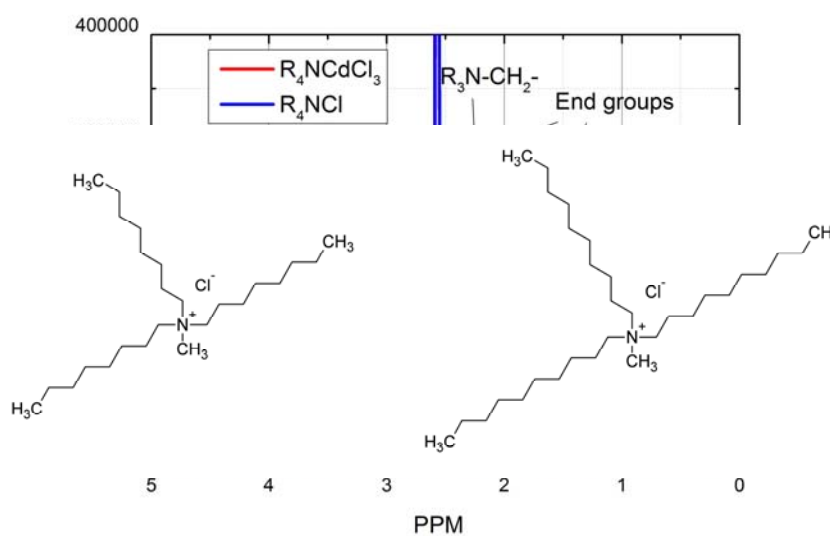
Trace the behavior of the element

Can be used to connect the data from the different methods

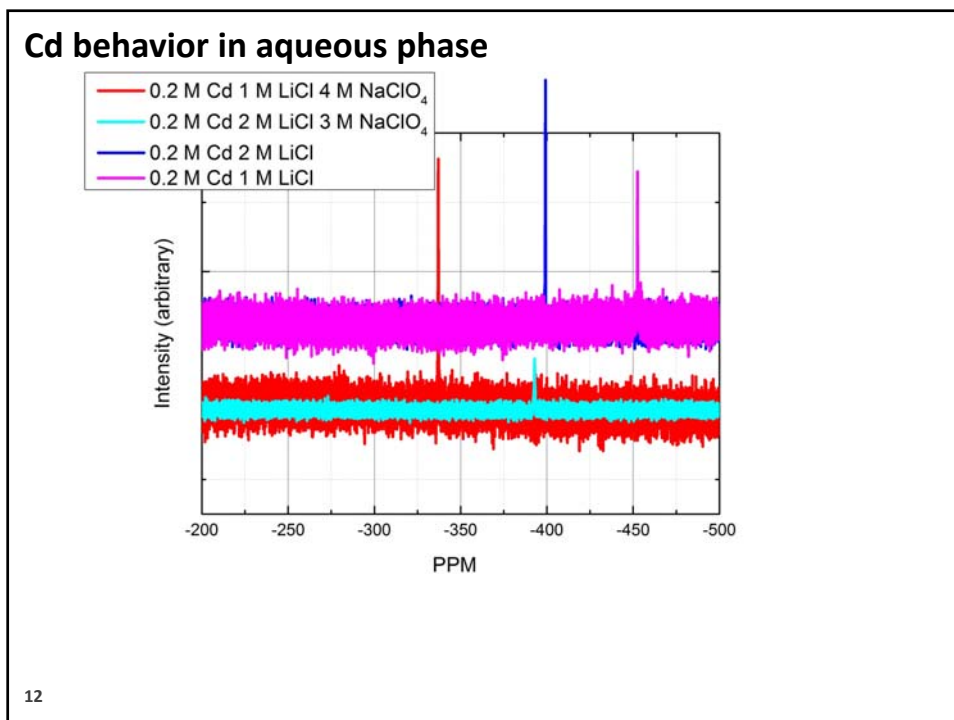
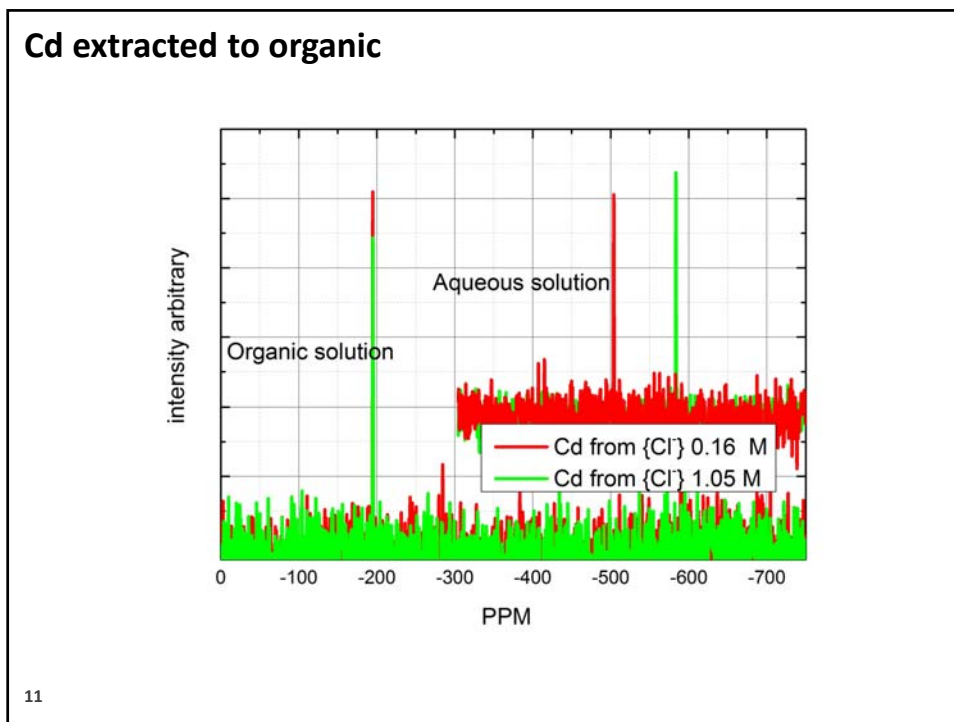
Data can be difficult to interpret

9

NMR looks at the area surrounding the atom



10



Pros and cons with NMR

Large group use it already at UIO

There exist several NMR active metals

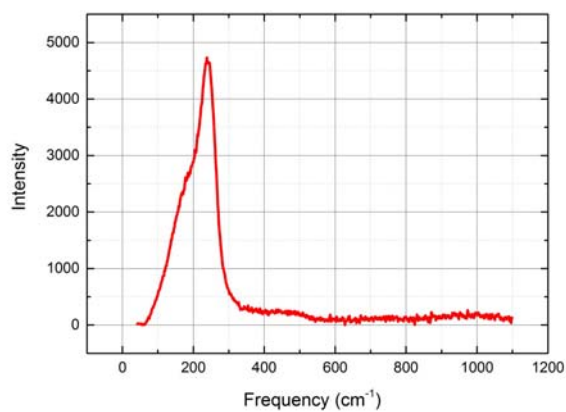
Easy to see metal affecting the extractant

Little used for metals

Need relatively high concentration of Cd

13

Raman information on the chemical bonds of the atoms



14

Pros and cons IR/Raman

Gives information bonds of the compound

This can be used for computations

Need high concentration

15

ICP-MS quantification of multiple elements



16

Pros and cons of ICP-MS

Sensitive method

Possible to detect multiple elements

Quantitative method

Can not handle high concentrations

Samples must be diluted before they are run

17

By tomorrow I will have finished 25 of the student credits



Molecular modelling



Writing



Ethics



18 ICP-MS



The course in hydrometallurgy is left

In the fall will visit conferences in Helsinki and in Québec

NRC9 in Helsinki focuses on
radiochemical methods



IMPC 2016 in Québec is focuses on
hydrometallurgy



19

Papers to be written

Started writing on a paper about NMR, Cd and extraction

Started planning experiments for a screening test of
Aliquat 336 in different aqueous solutions

20

For the future

**Hopefully using techniques as Raman/Ir and NMR more.
Have also discussed with computational chemistry about
the possibility to use their techniques**

**Last meeting Glencore expressed a desire for experiments
performed with Zinc**

21

**Courses are nearly done, articles are forthcoming, and we
will be present at conferences**

**Liquid-liquid extraction can be used for the different
concentrations**

Our method portfolio is expanded

22