

## IUPAC Project Progress Report

**Date :** December 2005 ; Period: July 2005 – February 2006

**Project number:** 1999-050-1-500

**Project Title:** Chemical Speciation of Environmentally Significant Heavy metals and Inorganic Ligands

**Task Group Leader:** Staffan Sjöberg

**Starting date:** August 2000

### Report:

1. Projected completion date (documents ready for external review):

The present project can be regarded as consisting of 5 +1 subprojects (5 +1 papers). The first subproject is completed and the second one will be finished by the end of March 2006 (ready for external review). Completion dates with respect to the remaining subprojects is set to the end of 2007.

2. Have the project objectives been modified during the last 6 months?

No, just the time schedule.

3. Please list the task group members involved in the work during the last 6 months.

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4. Difficulties encountered (or concerns):

To keep up with time tables

5. Please list the to-date results (outputs) of the project:

The objective of the project is to critically evaluate speciation and equilibria of a series of metal ion – ligand systems. The cations are H<sup>+</sup>, Cu<sup>2+</sup>, Zn<sup>2+</sup>, Cd<sup>2+</sup>, Hg<sup>2+</sup> and Pb<sup>2+</sup> and the ligands are Cl<sup>-</sup>,

$\text{OH}^-$ ,  $\text{CO}_3^{2-}$ ,  $\text{PO}_4^{3-}$  and  $\text{SO}_4^{2-}$ . There is an agreement that the different evaluations will result in 5+1 different papers: One paper per metal ion and a summarizing paper. So far the first paper dealing with the different Hg(II) systems is completed and has been published. In addition, the Cu(II) and Pb(II) systems are close to completion with written reports (drafts). Tentative deadlines for these systems are set to March 31 2005 and September 30 2006. Main parts of the Zn(II) and Cd(II) systems remain to be done.

6. Please list the dissemination events (viz. articles, CD, conference presentations; etc.)  
(i) already accomplished;

“Chemical Speciation of Environmentally Significant Heavy Metals with Inorganic Ligands  
Part 1: The  $\text{Hg}^{2+}$  -  $\text{Cl}^-$ ,  $\text{OH}^-$ ,  $\text{CO}_3^{2-}$ ,  $\text{SO}_4^{2-}$  AND  $\text{PO}_4^{3-}$  systems.”

Pure Appl. Chem., Vol. 77, No 4, pp739-800, 2005.

<<http://www.iupac.org/publications/pac/2005/7704/7704x0739.html>>

“Chemical Speciation of Hg(II) with Environmental Inorganic Ligands”

Australian Journal of Chemistry, 2004, 57, 993-1000.

Poster presentation at the World Chemistry Congress in Beijing in 2005.

“Chemical Speciation of Hg(II) with Environmental Inorganic Ligands”; K.Powell).

Invited lecture (S. Sjöberg, *Chemical Speciation of Environmentally Significant Heavy metals and Inorganic Ligands*) at SOPRO 2004, Karlsruhe, Germany March 2004.

(ii) planned

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Part 2: The  $\text{Cu}^{2+}$  -  $\text{Cl}^-$ ,  $\text{OH}^-$ ,  $\text{CO}_3^{2-}$ ,  $\text{SO}_4^{2-}$  and  $\text{PO}_4^{3-}$  systems.

Part 3: The  $\text{Pb}^{2+}$  -  $\text{Cl}^-$ ,  $\text{OH}^-$ ,  $\text{CO}_3^{2-}$ ,  $\text{SO}_4^{2-}$  and  $\text{PO}_4^{3-}$  systems.

Part 4: The  $\text{Cd}^{2+}$  -  $\text{Cl}^-$ ,  $\text{OH}^-$ ,  $\text{CO}_3^{2-}$ ,  $\text{SO}_4^{2-}$  and  $\text{PO}_4^{3-}$  systems.

Part 5: The  $\text{Zn}^{2+}$  -  $\text{Cl}^-$ ,  $\text{OH}^-$ ,  $\text{CO}_3^{2-}$ ,  $\text{SO}_4^{2-}$  and  $\text{PO}_4^{3-}$  systems.

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7. If your project is within 6 months of completion, how do you plan to utilise any remaining budget for this project?

8. Work on this project may have identified new problems, issues, challenges, emerging topics, opportunities for related projects, etc. Please indicate these here so that the Division can follow up on them.

There is an obvious need for critically evaluated thermodynamic data on different metal ion - organic ligand systems.