CHAPTER V

CONCLUSIONS

The following conclusion were obtained from this work.

1. The suitable composition for preparation HPMSP doped mesoporous silica was 1 TEOS : 140 H_2O : 13 CH_3OH : 0.18 CTAB : 0.06 HPMSP (Where H_2O was the aqueous solution of 0.1 M NaOH). This condition favors not only a short time to completely dissolve HPMSP molecules during the synthesis but also an excellent accessibility of the doping ligands to liquid phase. The X-ray powder patterns for as-synthesized HPMSP doped mesoporous silica indicated the crystalline structure of materials. After removal of organic molecules, the materials gave type IV nitrogen extraction-desorption isotherms, which were a characteristic of mesoporous solid.

2. The obtained HPMSP doped mesoporous silica showed an excellent copper extraction capacity even at low pH value (i.e. 0.21 mol/kg). The copper extraction capacity was not affected by $NaNO_3$, KNO_3 and $Ca(NO_3)_2$ presented in the copper solution. The complex formed between HPMSP and Cu(II) was 2:1 stoichiometry. The cobalt and nickel extraction capacity of HPMSP dope mesoporous silica from 0.1 M $NaNO_3$ medium was about 0.18 and 0.19 mol/kg in the pH range 4-6.5, respectively. The extraction equilibrium between metals and HPMSP doped mesoporous silica was also rapid. The complete desorption of cobalt from HPMSP doped mesoporous silica was achieved using 1 M HNO_3, whereas 80% of copper and 10% of nickel could be desorbed using the same acid solution.

Suggestions for future works.

1. The study of anions effect (e.g. Cl^-, SO_4^{2-}, PO_4^{3-}) on metal extraction capacity of HPMSP doped mesoporous silica.

2. The tests of recycling of HPMSP doped mesoporous silica and the study on metals extraction of HPMSP doped mesoporous silica by using dynamic method.

3. The application of HPMSP doped mesoporous silica for preconcentration of trace metals from natural sample.