CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

This study revealed that polybenzoxazine aerogel could be used for metal removal from wastewater. The sorption capacity of polybenzoxazine-based aerogel for metals at 298°K was in the following order: $Sn^{2+} > Cu^{2+} > Fe^{2+} > Pb^{2+} > Ni^{2+} > Cd^{2+} > Cr^{2+}$. This order could be related to both Irving-Williams rule and Van der Waals radius. Moreover, the results indicated that the amount of metal ions removed from the solutions depended on both the weight of adsorbent as well as the sorption time. The maximum adsorption capacity of mixed metal solutions was less than that of single metal solutions for all types of metal at the same conditions because of enthalpy of hydration, different pore sizes, number of nitrogen donor atom and Van der Waals radius. For desorption process, 40% of Sn^{2+} could be optimally recovered when 2% (w/v) NaCl with pH 4.01 was employed.

Polymeric ligand exchanger bound with Cu^{2+} or Fe^{2+} have been demonstrated for selective sorption of tartaric acid and arsenate from industrial or drinking water. As a result, polybenzoxazine-based aerogel loaded with Cu^{2+} and Fe^{2+} should be further investigated for this application.