



## **EXTRACTION OF DIVALENT COPPER, NICKEL AND LEAD IONS BY 2-AMINOTHIOPHENOL IN ROOM TEMPERATURE IONIC LIQUID**

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The extraction property of Cu(II), Ni(II) and Pb(II) by 2-aminothiophenol in a lab-synthesized green solvent room temperature ionic liquid 1-butyl-3-methylimidazolium hexafluorophosphate ([BMIM]PF<sub>6</sub>) was studied and compared to extraction in chloroform. Various parameters affecting the extraction efficiency, i.e. pH of solution, extraction time, type of stripping solution, stripping time and interfering ions, were investigated. The percentage extraction (%E) was found to increase along the pH with the order Cu(II) > Ni(II) > Pb(II) at any pH studied. The highest %E for Cu(II), Ni(II) and Pb(II) were equal to 75, 55 and 20% at extraction time of 30, 120 and 30 min, respectively. The extracted Cu(II) and Pb(II) in ionic liquid could be back-transferred simply by 0.5 M HNO<sub>3</sub> with percentage stripping higher than 98% in 10 min. The stripping of Ni(II), however, needs more vigorous condition, i.e. 3% H<sub>2</sub>O<sub>2</sub> in 0.5 M HNO<sub>3</sub> in 30 min. While the extraction efficiency of Cu(II) and Ni(II) without and with interfering ions such as sodium, calcium, magnesium, chloride and sulfate ions up to 1000 times were not different at 95% confidence level, that of Pb(II) was significantly affected by the presence of cations at 100 times. The extraction stoichiometry of Pb(II) and Cu(II) were 1:2 metal to ligand complex, that of Ni(II) being 1:3. The increasing proton concentration in aqueous phase after extraction, which equaled to two mole ratios of extracted metal ions, suggests that the extraction of Ni(II) and Pb(II) occurs via cation exchange. The extraction mechanism of Cu(II) is much more complicated as Cu(II) was oxidized to Cu(I) upon extraction. The higher percentage extraction of all metal ions studied in [BMIM]PF<sub>6</sub> compared to that in chloroform indicates that this solvent is a better receptor phase for metal ion removal, thus reinforcing the advantages of using green solvent.