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Abstract: The binding ability of N,N'-bis(1'-hydroxy-2'-acetonaphthone)propylenediimine (H_2L) towards metal ions was investigated by performing liquid-liquid extraction experiments to extract Cu^{2+} , Ni^{2+} , Co^{2+} , and Zn^{2+} ions from nitrate solutions. Extraction takes place by a cation exchange mechanism and the ligand shows a pronounced selectivity towards Cu^{2+} ions. Conventional log-log analysis of the extraction data reveals that the Cu^{2+} ions are extracted by a 1:1 (metal to ligand) complex formation. The effect of parameters influencing the extraction process, such as type of diluent and concentration of electrolyte in the aqueous phase, has been studied. The selectivity of the ligand was evaluated by competitive extraction of copper ions from a synthetic sample. The selective extraction of copper ions allows the use of H_2L as an ion-sensing material for fabricating a Cu(II)-ion-selective electrode. This sensor gave a good Nernstian response of 29.7 ± 0.3 mV/decade over a concentration range of 10^{-4} - 10^{-1} M of copper ions, independent of pH in the range of 3.5-6.5, with a detection limit of 2×10^{-5} M and a response time of < 20 s. The electrode was used as a potentiometric indicator for the complexometric titration of a copper solution with a standard solution of EDTA

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