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Liquid-liquid separation of copper and nickel ammine complexes using phenolic oxime mixture with tributyl phosphate

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Abstract:

In the present study, a complete separation of copper over nickel has been studied from an ammoniacal leach liquor of nickel laterite ore generated via the Caron process. For this purpose, a phenolic oxime (LIX 84-IC) used as the extractant molecule was mixed with tributyl phosphate (TBP) to inhibit the co-extraction of nickel with copper loading into the organic phase. The antagonistic effect of TBP was confirmed by the distribution coefficients to be $D_{mix} \ll D_{LIX\ 84-IC} + D_{TBP}$ and negative values of increment D . The highest separation ($\beta(Cu/Ni)$) of >1329 was yielded using the molar ratio of organic mixture at LIX 84-IC:TBP = 0.4:0.6 at an organic-to-aqueous phase ratio of 1. The thermodynamic properties of copper extraction exhibited an endothermic nature with ΔH degrees value of 5.4 kJ center dot mol(-1), indicating the formation of inner-sphere coordination between metal ions and the