SYNERGISTIC SOLVENT EXTRACTION OF CROWN ETHER COMPLEXES WITH ALKALI METAL PICRATES BY NEUTRAL DONOR SOLVENTS

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The solvent extraction of rubidium and caesium picrates has been studied at 25 °C with mixtures of a crown ether and tributyl phosphate (TBP) or trioctylphosphine oxide (TOPO) in benzene , and the adduct-formation constants in the benzene solution have been calculated. The crown ethers used in this work were 12-crown-4 (12C4), 15-crown-5 (15C5), and benzo-15-crown-5 (B15C5). The stoichiometric composition of any extracted complex under the present experimental conditions is alkali metal ion : crown ether : TBP or TOPO : picrate ion = 1 : 1 : 1 : 1. The TOPO complex is more extractable than the corresponding TBP complex. The extractability of the Rb^+ complex is larger than that of the corresponding Cs^+ complex. For both TBP and TOPO, the adduct-formation constant value sequences of Rb^+ and Cs^+ are B15C5 > 12C4 > 15C5 and 12C4 > B15C5 > 15C5, respectively.

Table 1. Adduct-formation constants ($\log K_{MLL'A,o}$) in a benzene solution at 25 °C

	L	L'	Rb^+	Cs^+
$\log K_{MLL'A,o}$ *	12C4	TBP	1.26	1.19
		TOPO	1.76	1.61
	15C5	TBP	0.81	0.68
		TOPO	1.50	1.27
	B15C5	TBP	1.32	1.16
		TOPO	1.83	1.52

* M = alkali metal, o denotes an organic phase.

L = crown ether,

L' = neutral donor solvent,

A^- = picrate ion,