

Control of selectivity for metal ions by adding salts
in the extraction with calixarene compounds and
development of novel separation system for metals

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Summary

Calixarene compounds that are well-known as excellent ionophores were employed as extraction reagents to investigate the effect of the addition of salts on the complexation with metal ions.

Calix[4]arene carboxylate was found to selectively extract sodium ion over other three alkali metal ions, Li, Na, and K, and to extract two sodium ions with unit molecule. This behavior is very peculiar to calix[4]arene compounds in the extraction of alkali metal ions.

From aqueous solutions containing one of these three alkali metal ions, the extraction of rare earth metal ions were carried out with calixarene carboxylate to examine the effect of these coexisting alkali metal ions. The extraction ability and selectivity were significantly enhanced only by sodium ion. This enhancement is suggested to be attributable to the co-extraction with sodium ion. That is, calix[4]arene derivative extracts sodium ion at first, and then furthermore rare earth metal is co-extracted.

In the extraction of copper ion, the addition of sodium ion to aqueous solution also enhances the extraction. It is also attributable to the co-extraction of sodium ion.

The extraction ability and the selectivity for metal ions of calix[4]arene carboxylate is significantly affected, which will enable by the addition of sodium ion. The development of novel separation technique for metal ions controlled by the addition of sodium ion.