

## EXTRACTION SEPARATION OF YTTRIUM FROM STRONTIUM IN CARBONATE MEDIA

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Yttrium, being a dispersed element, plays a significant role in industry, including nuclear medicine. To date, numerous methods have been developed for extracting yttrium from complex matrices, such as ion-exchange chromatography and liquid-liquid extraction. One of the most promising methods is membrane separation using a liquid membrane, which allows for the simultaneous extraction and stripping operations, effectively utilizing organic extractants. Such systems have also been proposed for use in yttrium-strontium generators [1].

Previous studies have shown that for the selective separation of trace amounts of yttrium from strontium in carbonate media, synergistic mixtures of methyltrioctylammonium carbonate (MTOAC) with aromatic alcohols such as 2,3-dihydroxynaphthalene (2,3-DHN) and 8-hydroxyquinoline (8-HQ) can be used as extractants [2].

In this study, liquid and membrane extraction of yttrium and strontium from carbonate media were investigated using solutions of synergistic mixtures of phenols with quaternary ammonium bases as the organic phase. It was shown that at a concentration of 0.005 M, both 8-HQ and 2,3-DHN exhibit distribution coefficients sufficient for membrane separation, as presented in Table 1.

**Table 1.** Extraction characteristics of the studied systems.

Extractants	Solvent	$D_Y$	Stripping degree in 0,05 M $HNO_3$
2,3-DHN	dibutyl phthalate	0,2	0,4
8-HQ	dibutyl phthalate	0,07	0,6
2,3-DHN	dibutyl phthalate with dichloroethane, 1:1	0,2	1
8-HQ	dibutyl phthalate with dichloroethane, 1:1	0,2	0,4

Furthermore, the selectivity coefficients of these extractants for the Y/Sr pair exceed  $10^4$ , making the studied systems applicable in Y/Sr generators.

### References

- [1] *Chem. Pap.* **2018**, 72, 1487  
[2] *Radiochemistry* **2023**, 65, 219

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