

**HIDEX**



HIDEX

# Sample preparation

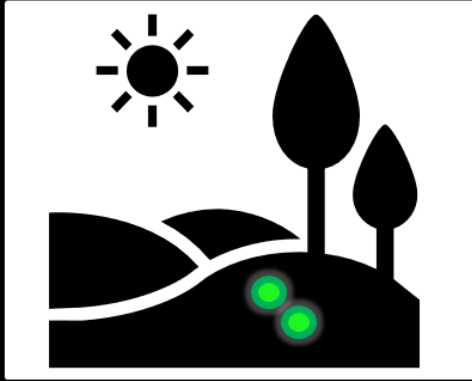


600 OX Oxidizer



Q-ARE 100plus

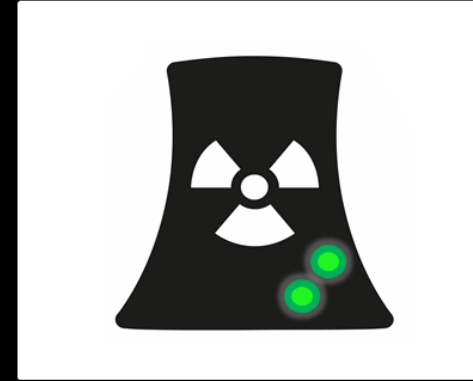
# Sample



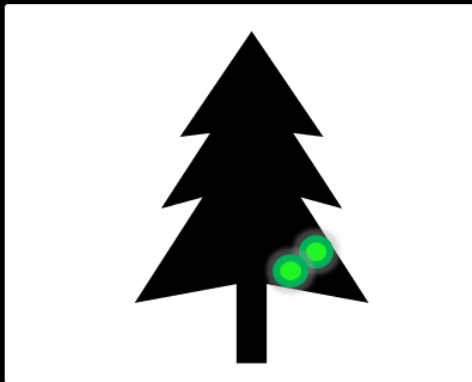
soil



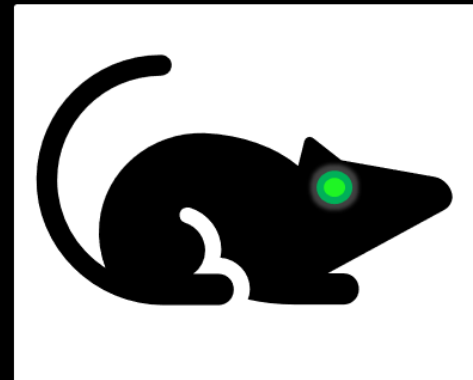
water



Nuclear power plant  
decommissioning



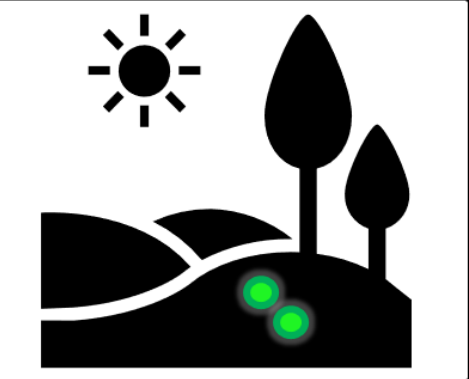
plant



tissue

 = radioisotope

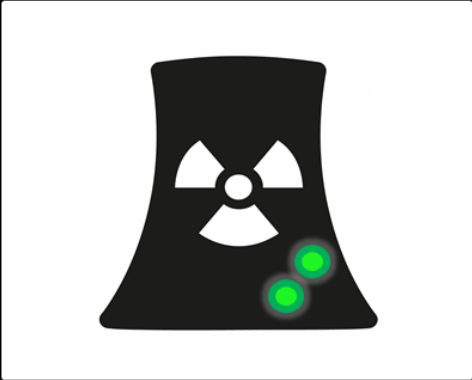
# Sample



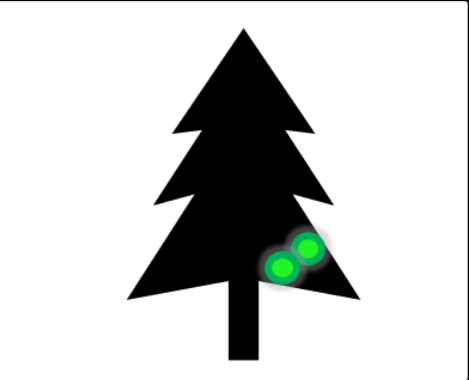
soil



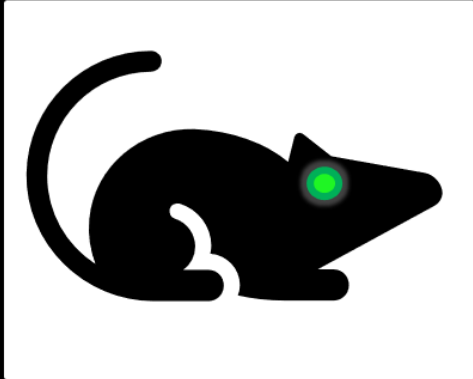
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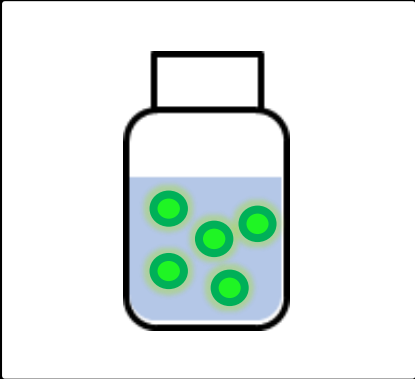


plant



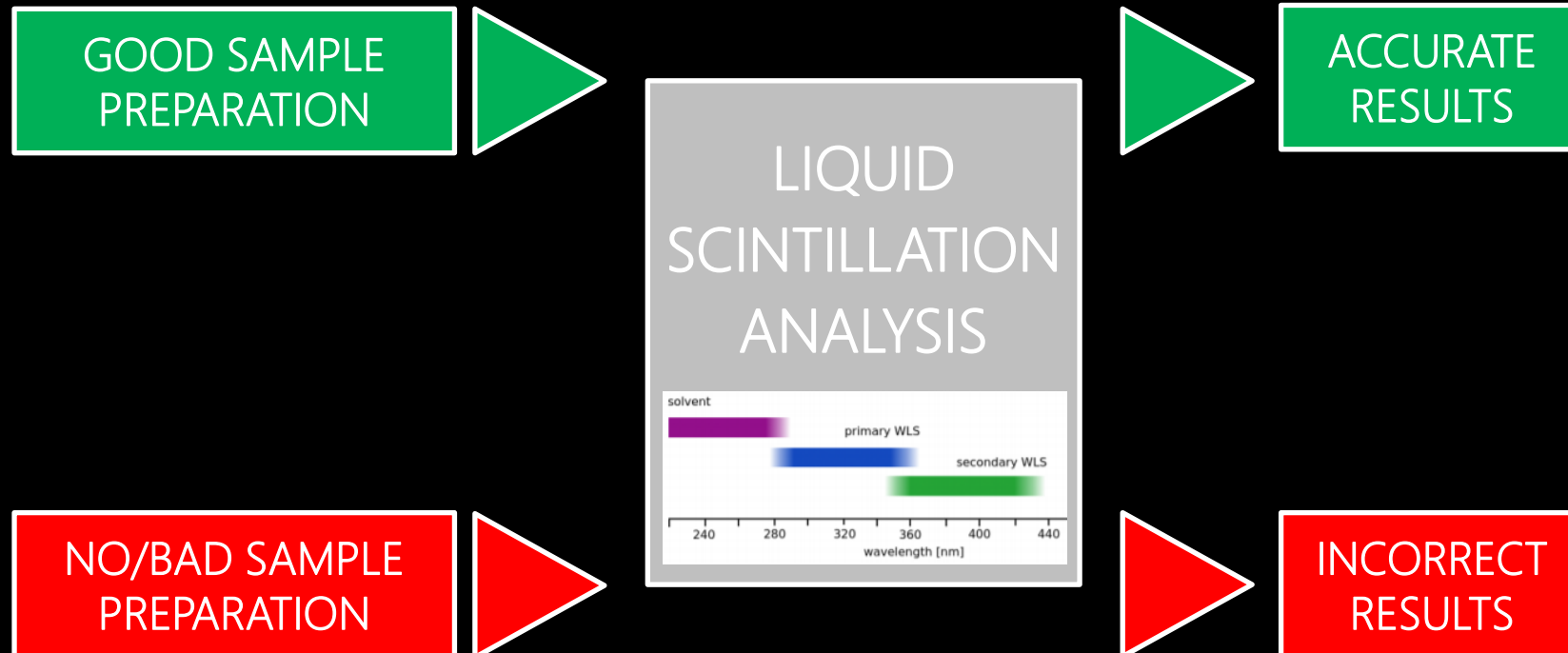
tissue

● = radioisotope



Homogenous liquid sample for  
Liquid Scintillation Counting

# Sample preparation



# Hidex Q-ARE

QUICK  
AUTOMATED  
RADIONUCLIDE  
EXTRACTION



# Extraction chromatography

Extraction chromatography (EXC) combines the selectivity of liquid-liquid extraction with ease-of-use of the solid phase extraction (SPE) chromatography

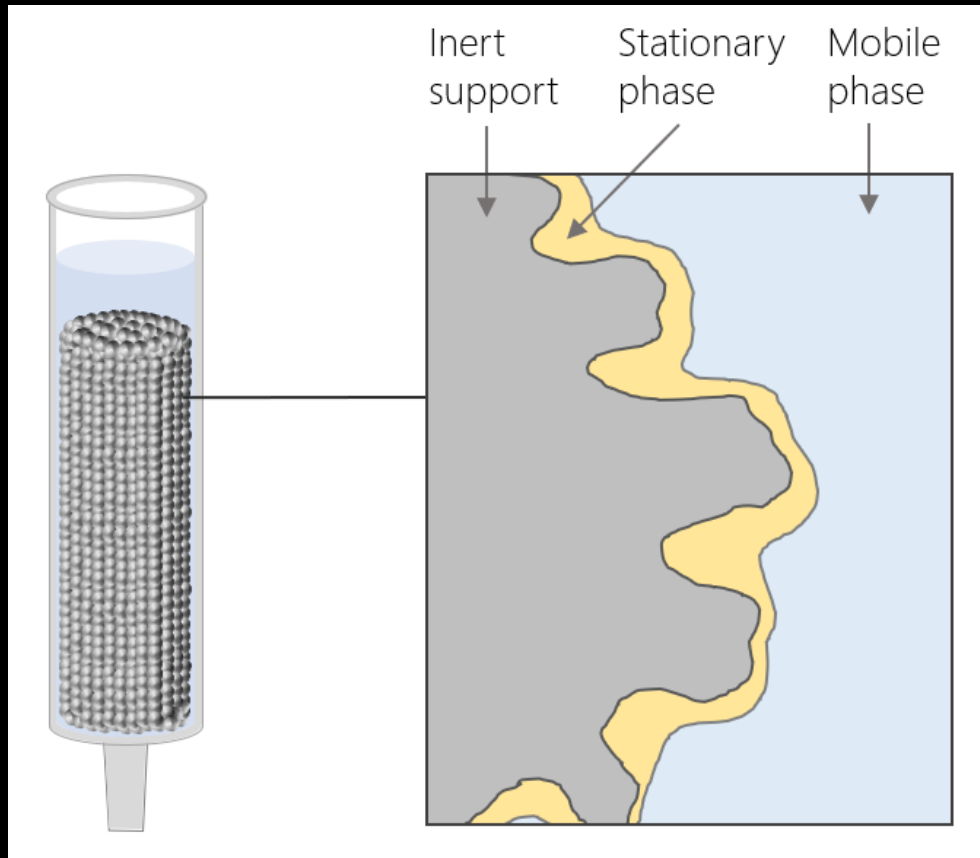


Figure 1. Extraction chromatography resin structure. The stationary phase that contains liquid extractant compound specific to the target radionuclide is impregnated on the inert support.

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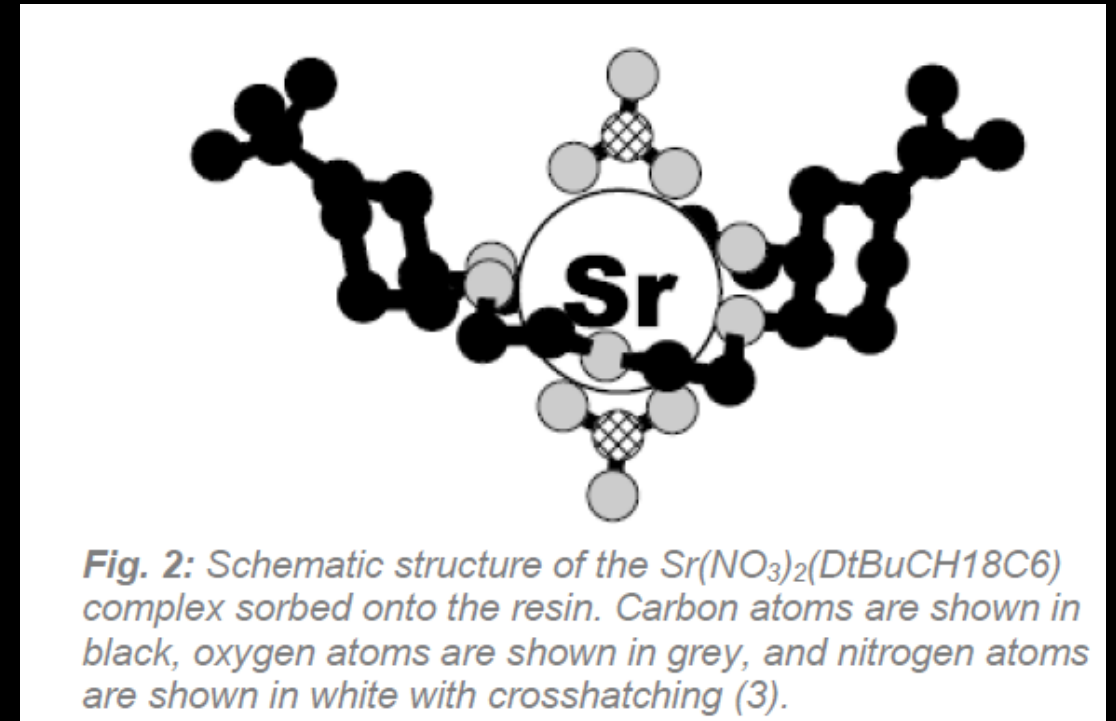
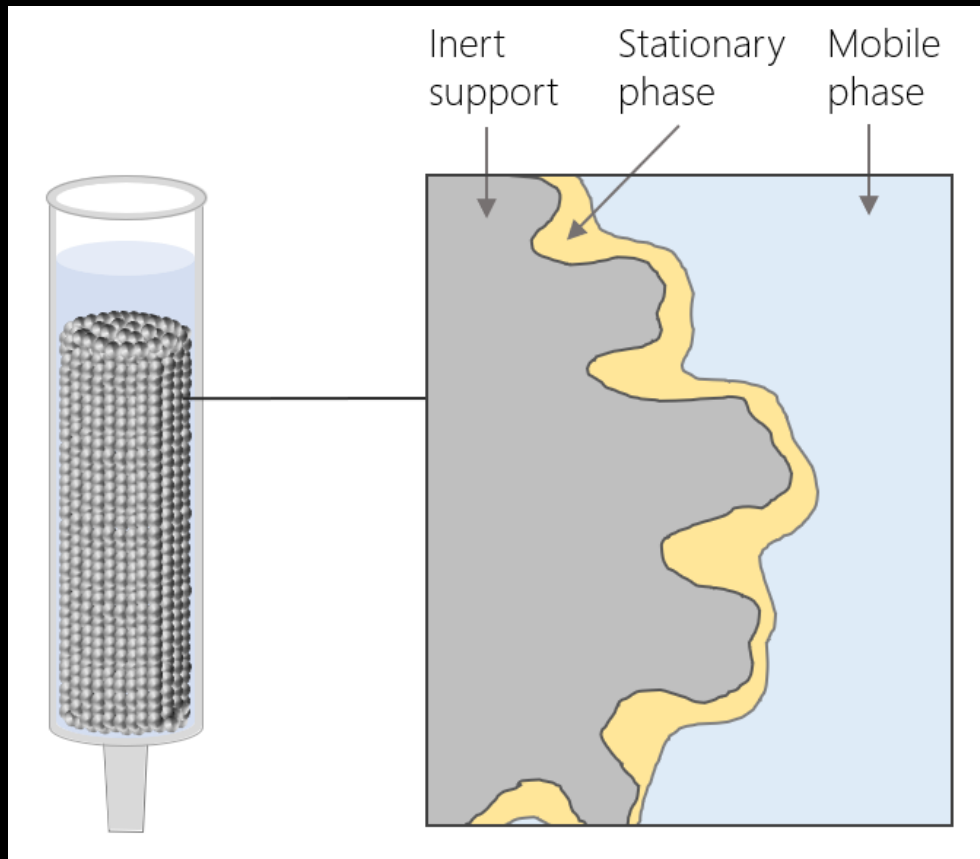


Figure 1. Extraction chromatography resin structure. The stationary phase that contains liquid extractant compound specific to the target radionuclide is impregnated on the inert support.



# Extraction chromatography

Steps:

## 1. Conditioning

- Strong acid for activation of the resin

## 2. Sample loading

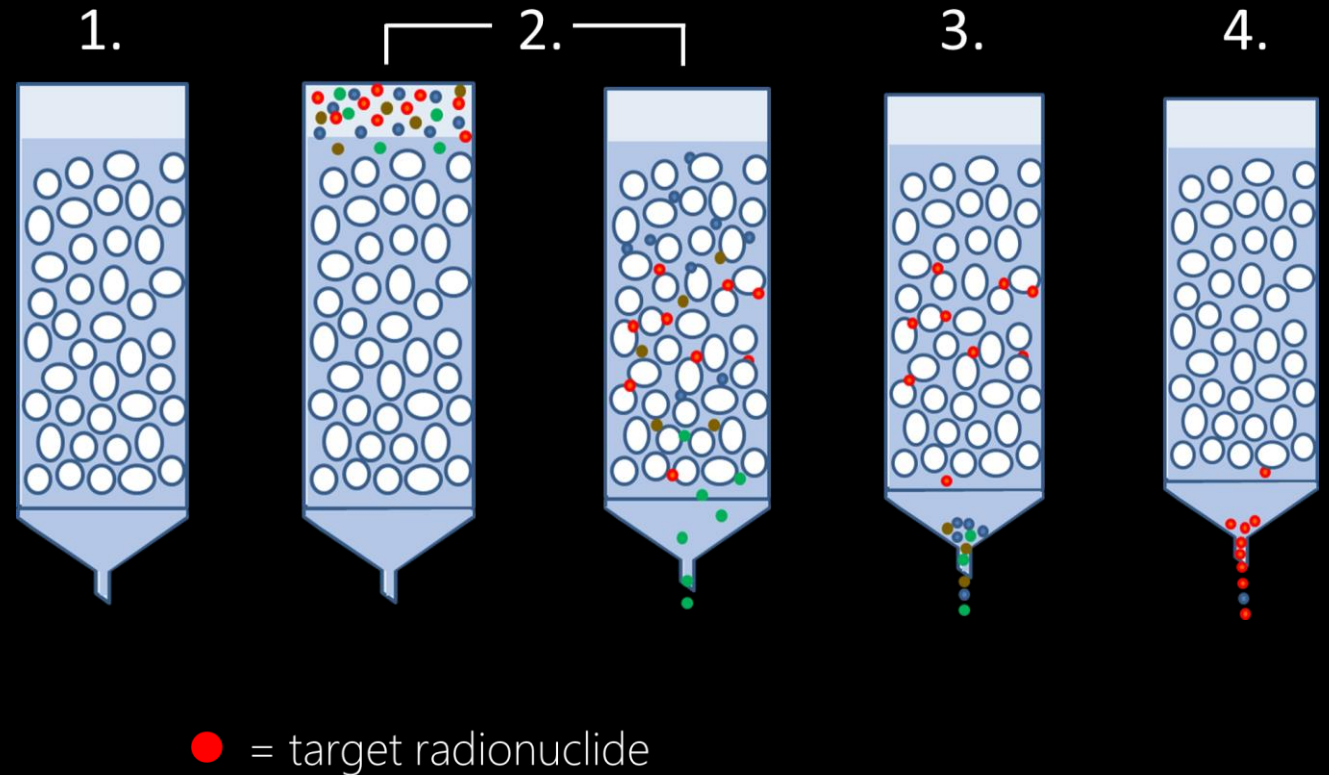
- Sample is applied and the target radionuclides are caught by the resin

## 3. Washing

- Impurities are washed away by acid

## 4. Elution

- Radionuclide is eluted and collected



# Extraction chromatography

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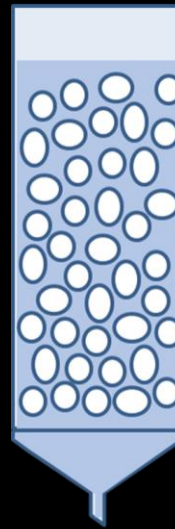
## 4. Elution

- Radionuclide is eluted and collected

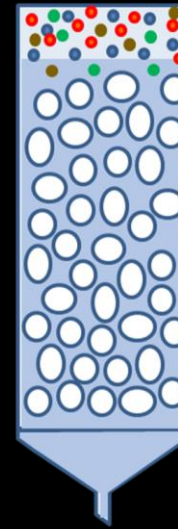
Acid



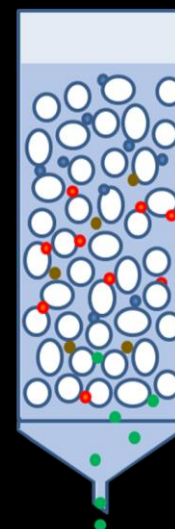
1.



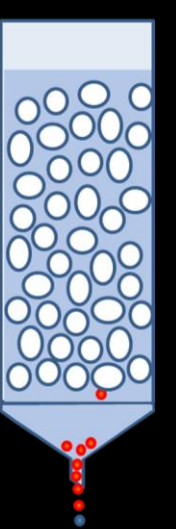
2.



3.



4.



● = target radionuclide

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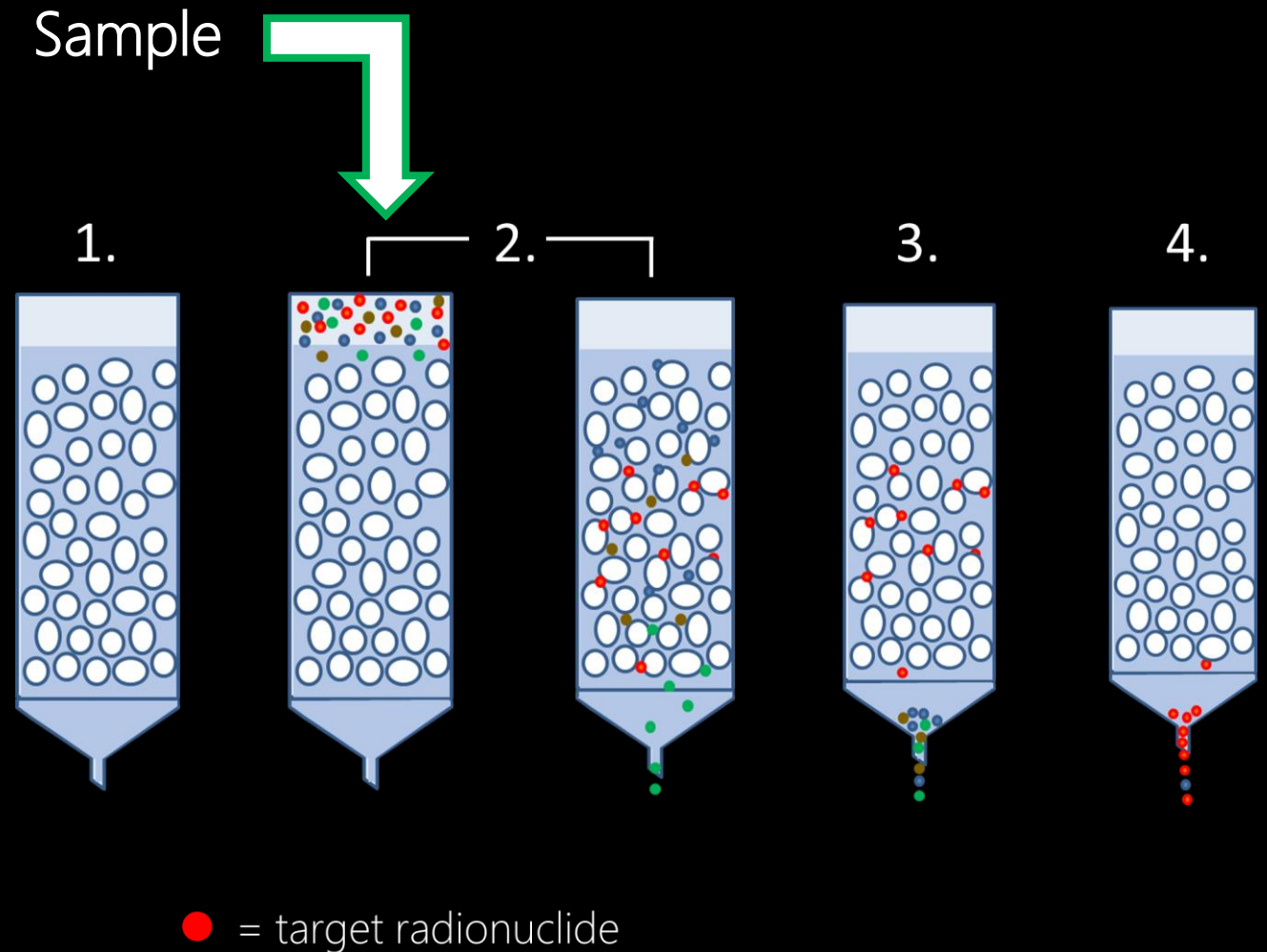
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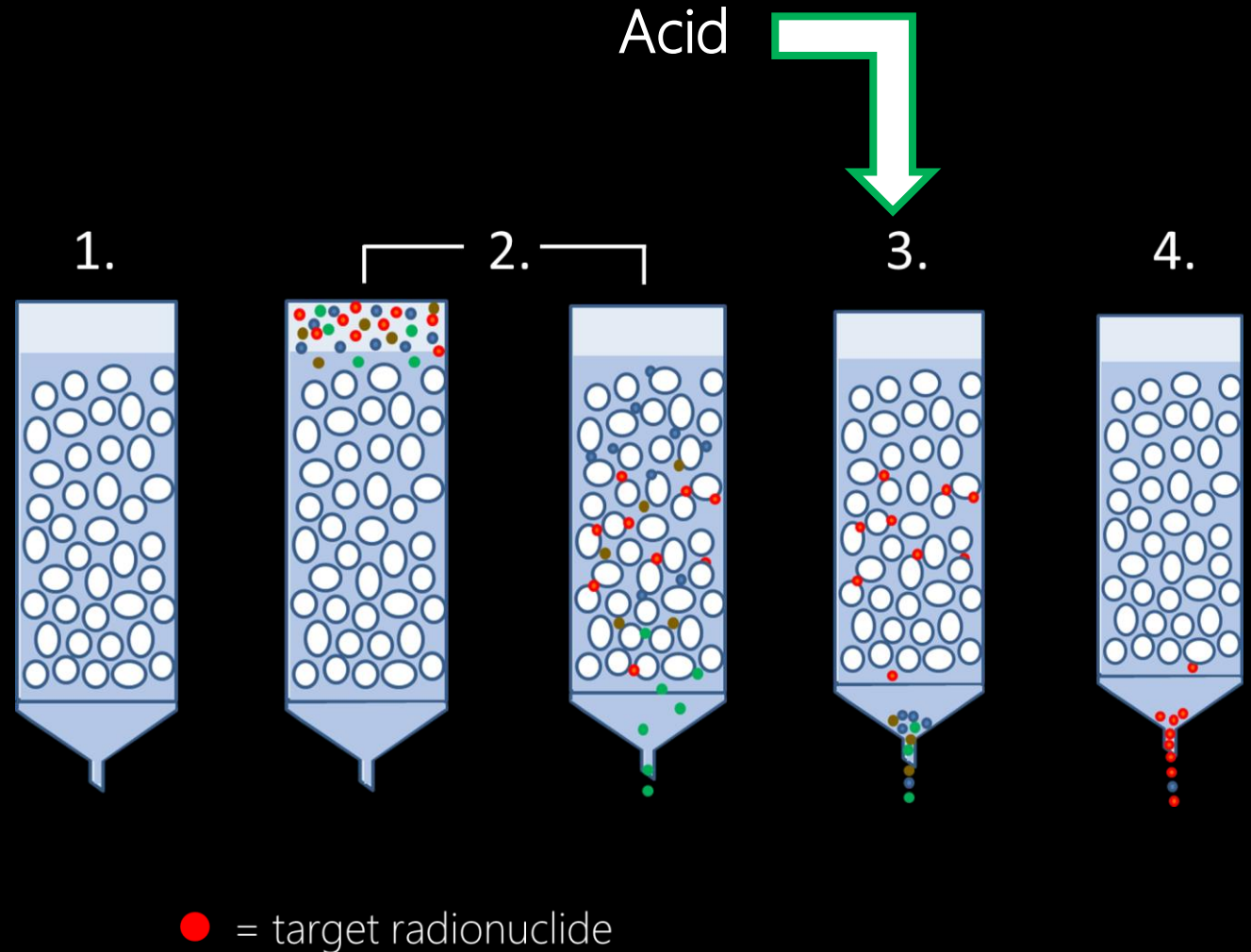
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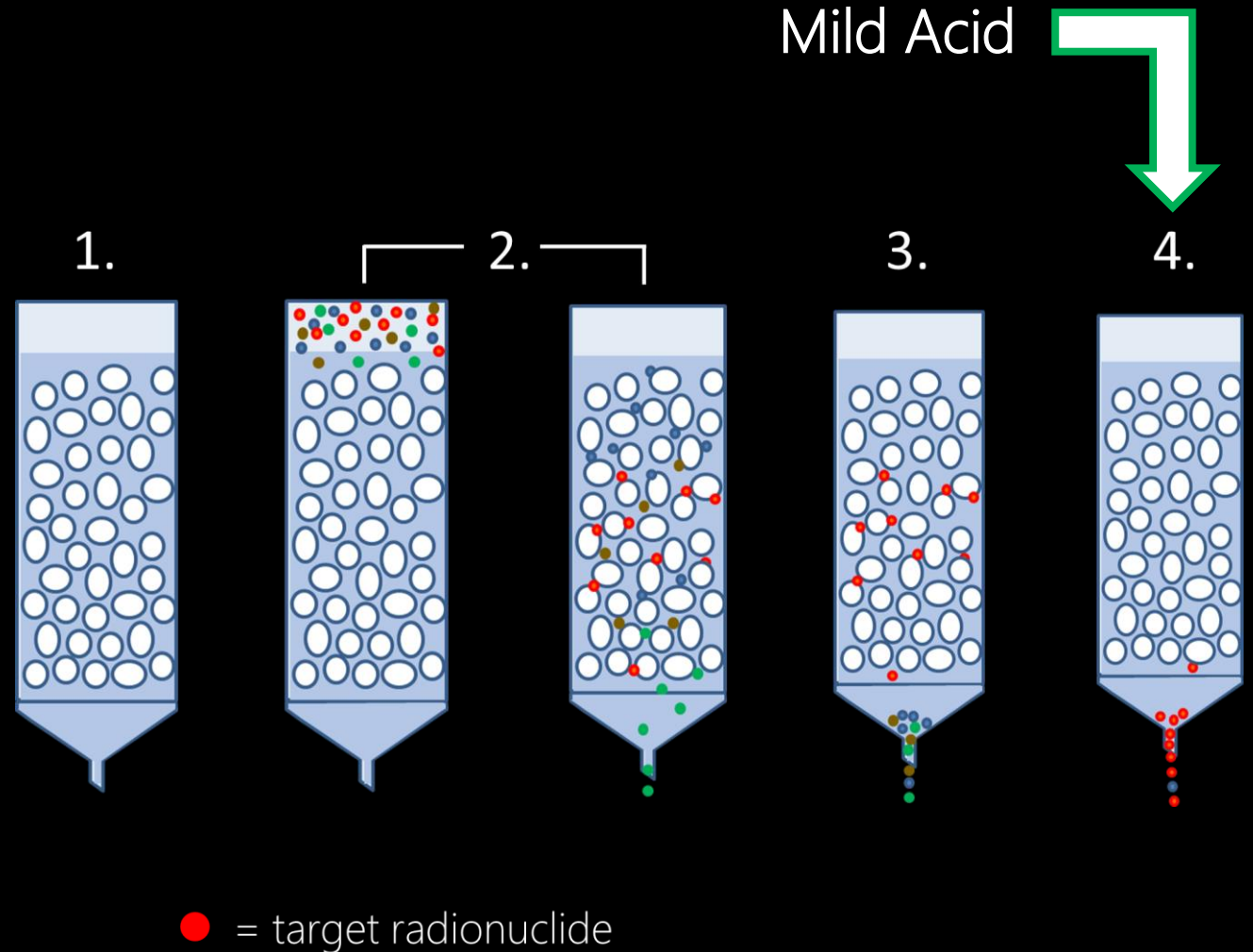
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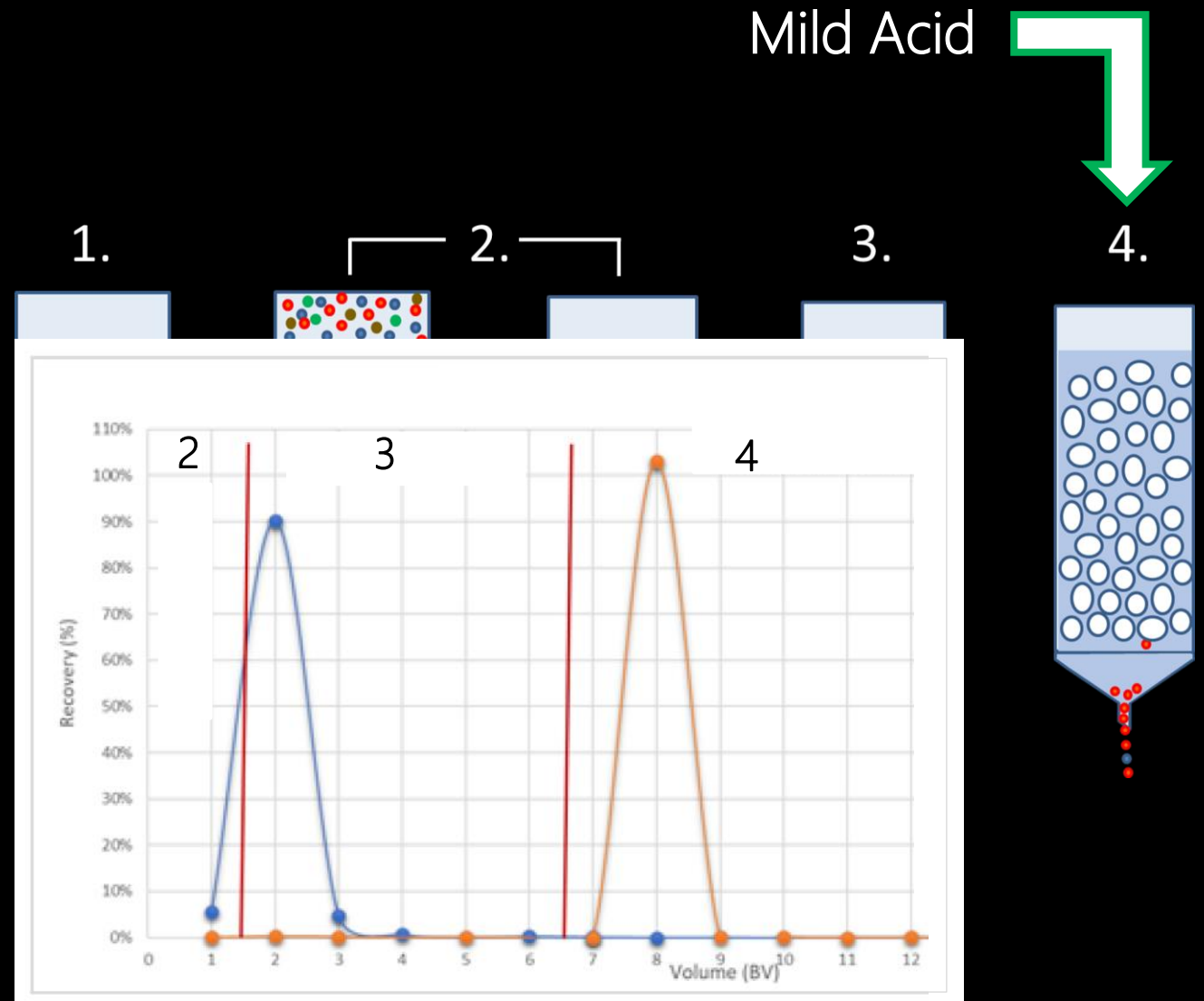
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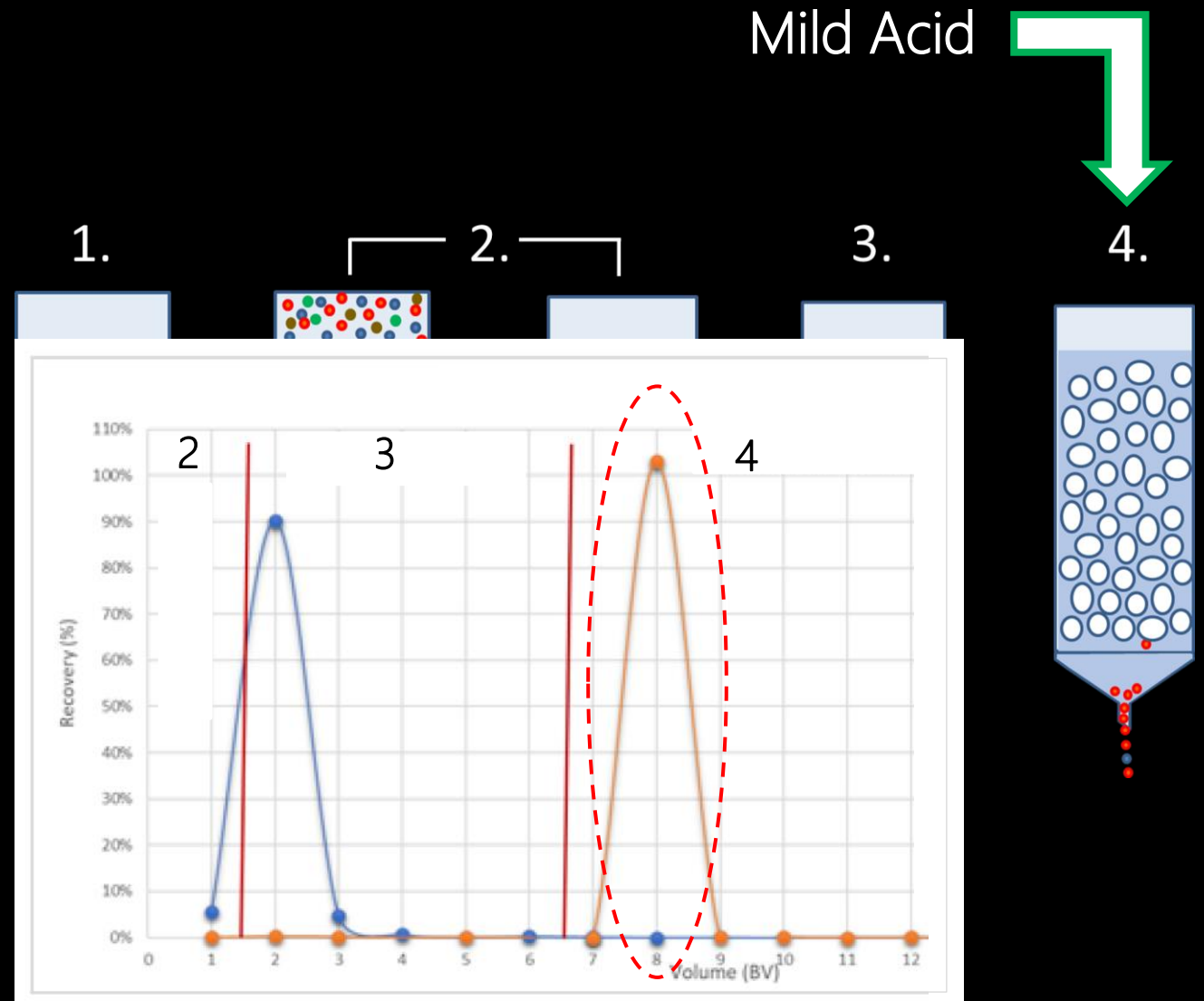
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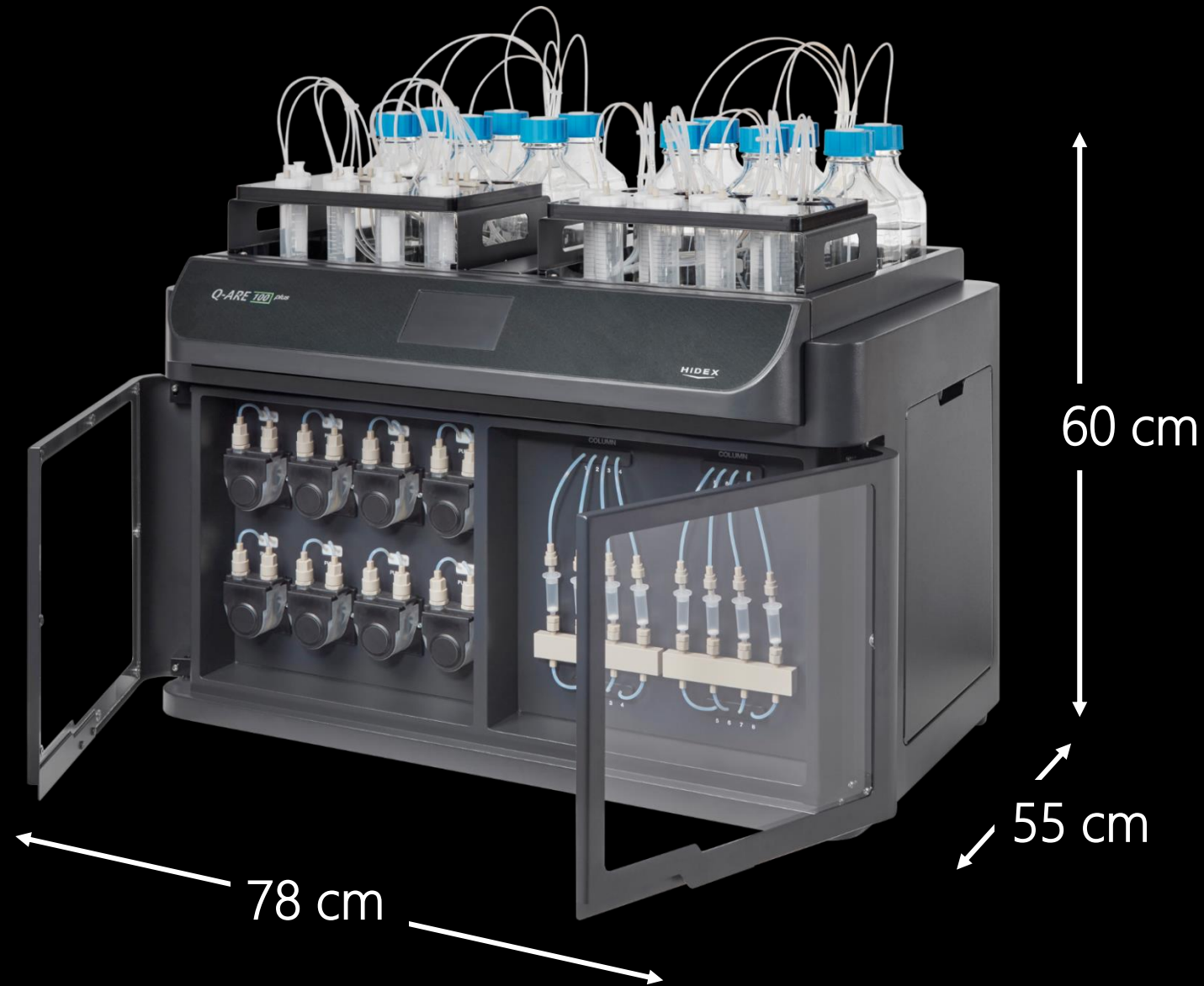
# Traditional way. Manual Extraction chromatography





# Automated Extraction chromatography

Q-ARE  
100plus



# Q-ARE 100plus

12 Reagent solutions

8 Samples

Elution fraction  
collection bottles  
(total 20)

1 pump for each  
sample

8 extraction  
chromatography  
columns



# Q-ARE 100plus

12 Reagent solutions

8 Samples

Elution fraction  
collection bottles  
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1 pump for each  
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8 extraction  
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# Q-ARE 100plus

12 Reagent solutions

8 Samples

Elution fraction  
collection bottles  
(total 20)

1 pump for each  
sample

8 extraction  
chromatography  
columns



# Q-ARE 100plus

12 Reagent solutions  
6 + 6

8 Samples

1 pump for each  
sample

Elution fraction  
collection bottles  
(total 20)

8 extraction  
chromatography  
columns



# Q-ARE 100plus

12 Reagent solutions

8 Samples

Elution fraction  
collection bottles  
(total 20)

1 pump for each  
sample

8 extraction  
chromatography  
columns



# Q-ARE 100plus

Acid resistant and fume hood free design

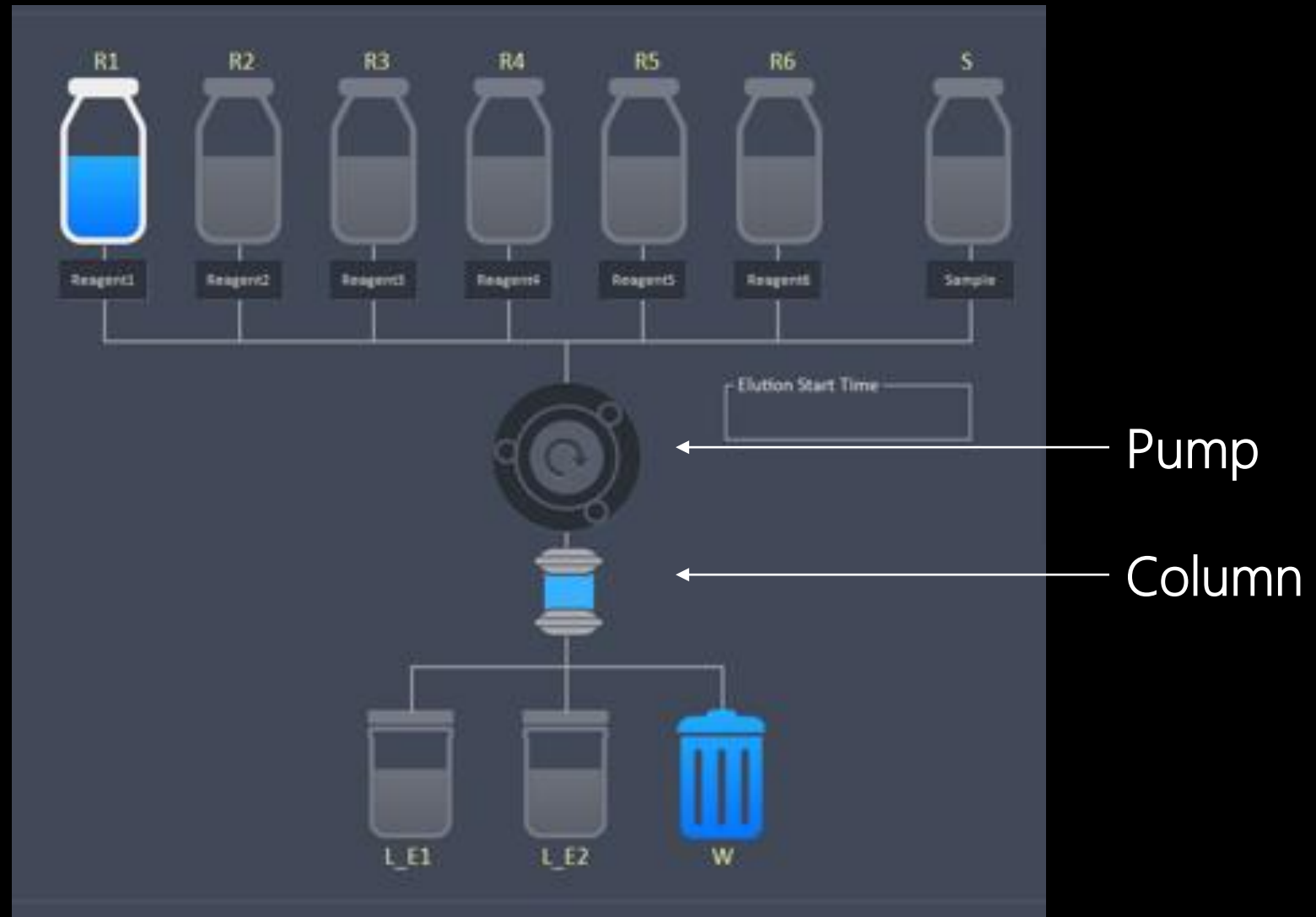
Acid resistant pumps,  
valves, tubing and  
fittings (PEEK, PTFE)



Acrylic doors  
covering the pumps  
and columns

# Hidex Q-ARE liquid handling

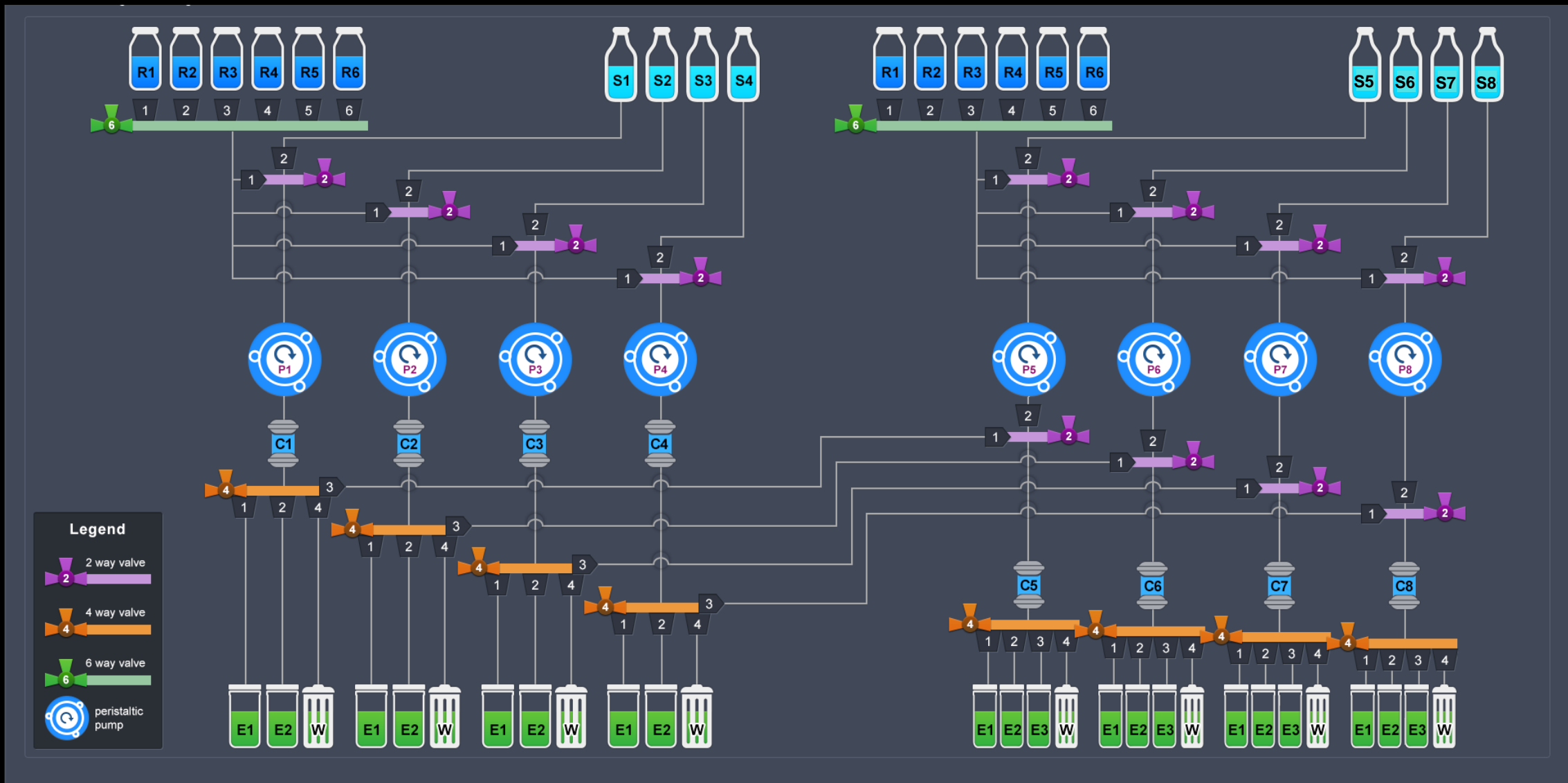
Basic view





# Hidex Q-ARE 100plus liquid handling

All lines



# Hidex Q-ARE 100plus software

Home > Single Column Mode

· Column Selection: **Left** | All | Right  
 · Number of Sequence: 1  
 · Process Name: Conditioning  
 · Reagent: 1) D.W.  
 · Mounted Position: E1  
 · Flow Rate: 0.5 ml / min  
 · Total Volume: 0.5 ml  
 · Lower Volume of Reagent: 0 ml

Left Column

1



ON

$Q = 0.1 \cdot R + 0.0$

2



ON

$Q = 0.2 \cdot R + 0.0$

3



ON

$Q = 0.1 \cdot R + 0.0$

4



ON

$Q = 0.2 \cdot R + 0.0$

SEQ No.	Process Name	Reagent	Mounted Position	Flow Rate (ml/min)	Total Volume (ml)	Lower Volume of Reagent (ml)
1	Conditioning	1) D.W	E1	0.5	0.5	0
2	Conditioning	1) D.W	E1	0.5	0.5	0
3	Conditioning	1) D.W	E1	0.5	0.5	0
4	Conditioning	1) D.W	E1	0.5	0.5	0
5	Conditioning	1) D.W	E1	0.5	0.5	0
6	Conditioning	1) D.W	E1	0.5	0.5	0
7	Conditioning	1) D.W	E1	0.5	0.5	0
8	Conditioning	1) D.W	E1	0.5	0.5	0
9	Conditioning	1) D.W	E1	0.5	0.5	0
10	Conditioning	1) D.W	E1	0.5	0.5	0

Right Column

5



ON

$Q = 0.1 \cdot R + 0.0$

6



ON

$Q = 0.1 \cdot R + 0.0$

7



ON

$Q = 0.2 \cdot R + 0.0$

8



ON

$Q = 0.2 \cdot R + 0.0$

SEQ No.	Process Name	Reagent	Mounted Position	Flow Rate (ml/min)	Total Volume (ml)	Lower Volume of Reagent (ml)
1	Conditioning	7) D.W	E1	0.5	0.5	0
2	Conditioning	7) D.W	E1	0.5	0.5	0
3	Conditioning	7) D.W	E1	0.5	0.5	0
4	Conditioning	7) D.W	E1	0.5	0.5	0
5	Conditioning	7) D.W	E1	0.5	0.5	0
6	Conditioning	7) D.W	E1	0.5	0.5	0
7	Conditioning	7) D.W	E1	0.5	0.5	0
8	Conditioning	7) D.W	E1	0.5	0.5	0
9	Conditioning	7) D.W	E1	0.5	0.5	0
10	Conditioning	7) D.W	E1	0.5	0.5	0

# Applications: all Triskem applications

Extractant	Resin	Applications
DTCH18C6/octanol	SR	Strontium
DTCH18C6/HDEHP	TK100	Pb, Sr from water
CMPO/TBP	TRU	Actinides, Am
	RE	Rare Earth Elements
Aliquat 336	TEVA	Actinides (IV) and Tc
DPPP	UTEVA	Uranium (VI)
Dipex	Actinide, Be	Total alpha, Be
HDEHP	LN	Lanthanides, Ac
DMG	NI	Nickel
DGA (Normal & Branched)	DGA DGA Sheets	Actinides, Am, Ac Ra-223, Pb-212, Ac-225, Ga-68
TBP	TBP	Sn, Actinides
Phosphine sulfide	CL	PGE, Cl-36 / I-129
Oximes	CU	Cu
Hydroxamate	ZR	Zr, Ti, Mo, Ga, Ge
Long-chained alcohol	TK400	Pa, Nb, Mo
TOPO	TK200	U, Th, Pu

# Hidex Q-ARE

## Q-ARE 100plus

- 8 samples simultaneous processing
- 8 pumps and 8 columns



## Q-ARE 50

- 4 samples simultaneous processing
- 4 pumps and 4 columns



# Automated sample preparation

- ✓ Reduced worker exposure to radioactivity and hazardous chemicals > Improved user safety
- ✓ Improved reliability
- ✓ Higher throughput
- ✓ Shorter analysis time
- ✓ Lower overall costs (higher throughput with less man-hours)



For more information,  
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