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For automation of sample preparation

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Approaches for Automation of sample preparation

Direct automation of manual procedures: Offline SPE

Integration with instrumental analysis: Online SPE

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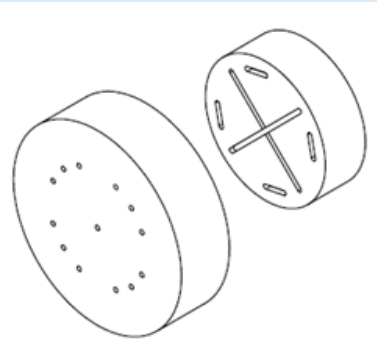
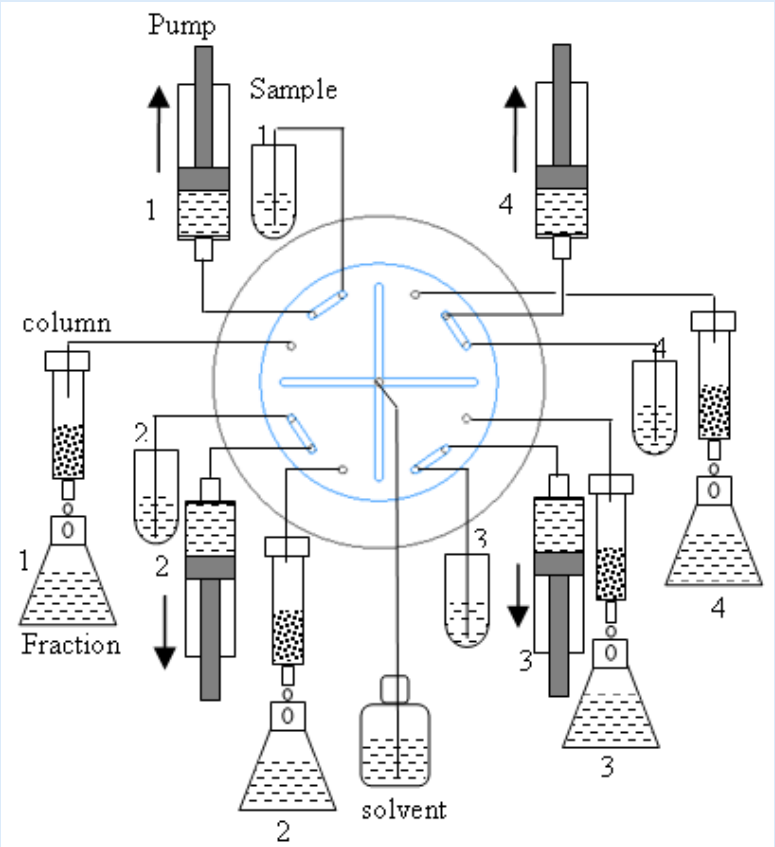
Core technologies: design and manufacture of special valves



A multi functional valve for multiple channel fluid handling

US patent number 8813785 B2



Status 1. Pumps are connected to samples.

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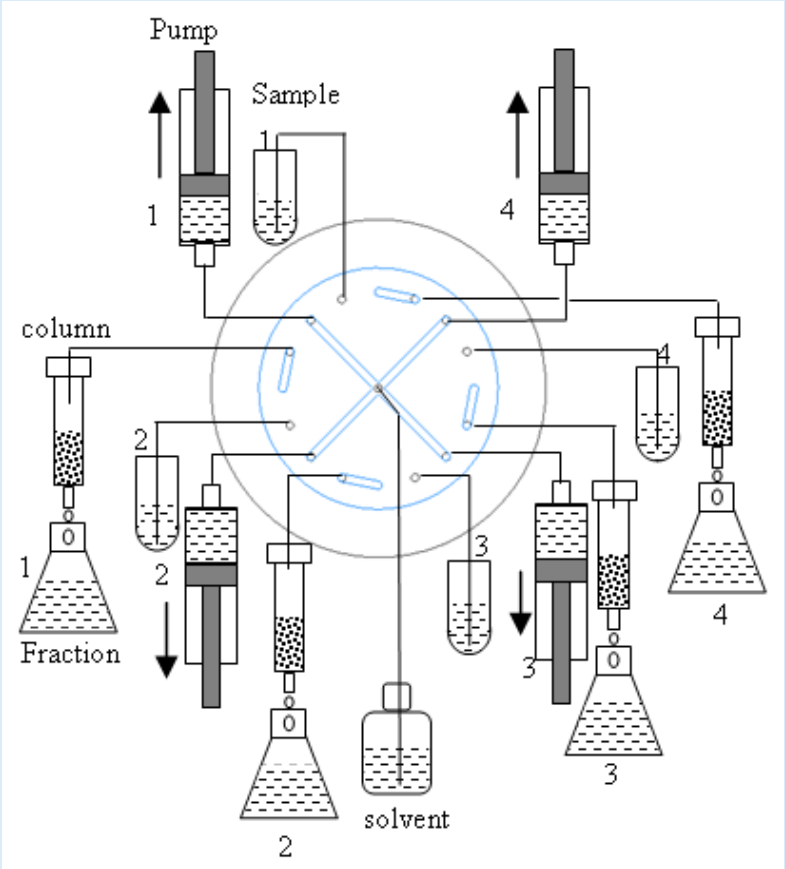
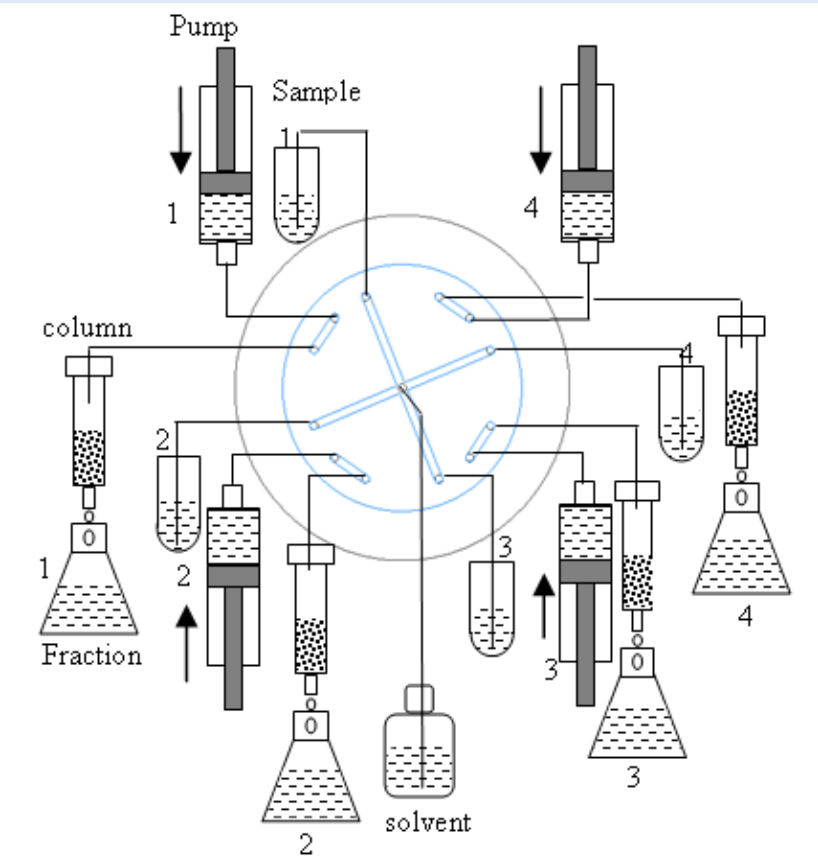
Valve for multi channel fluid handling



Status 2. Pumps are connected to solvents.



Status 3. Pumps are connected to columns.

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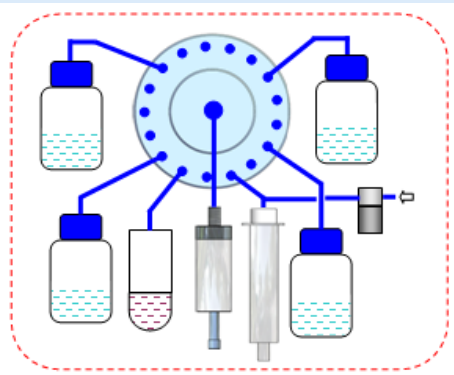
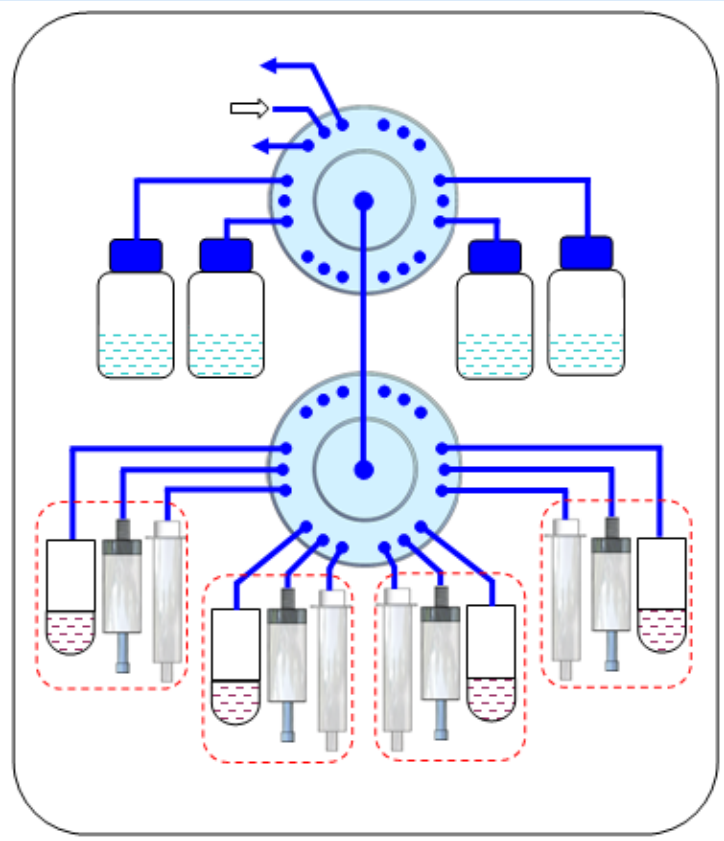
An application example of the multifunctional valve



Top: Module for one channel in a typical multi channel SPE and components in a 4 channel SPE

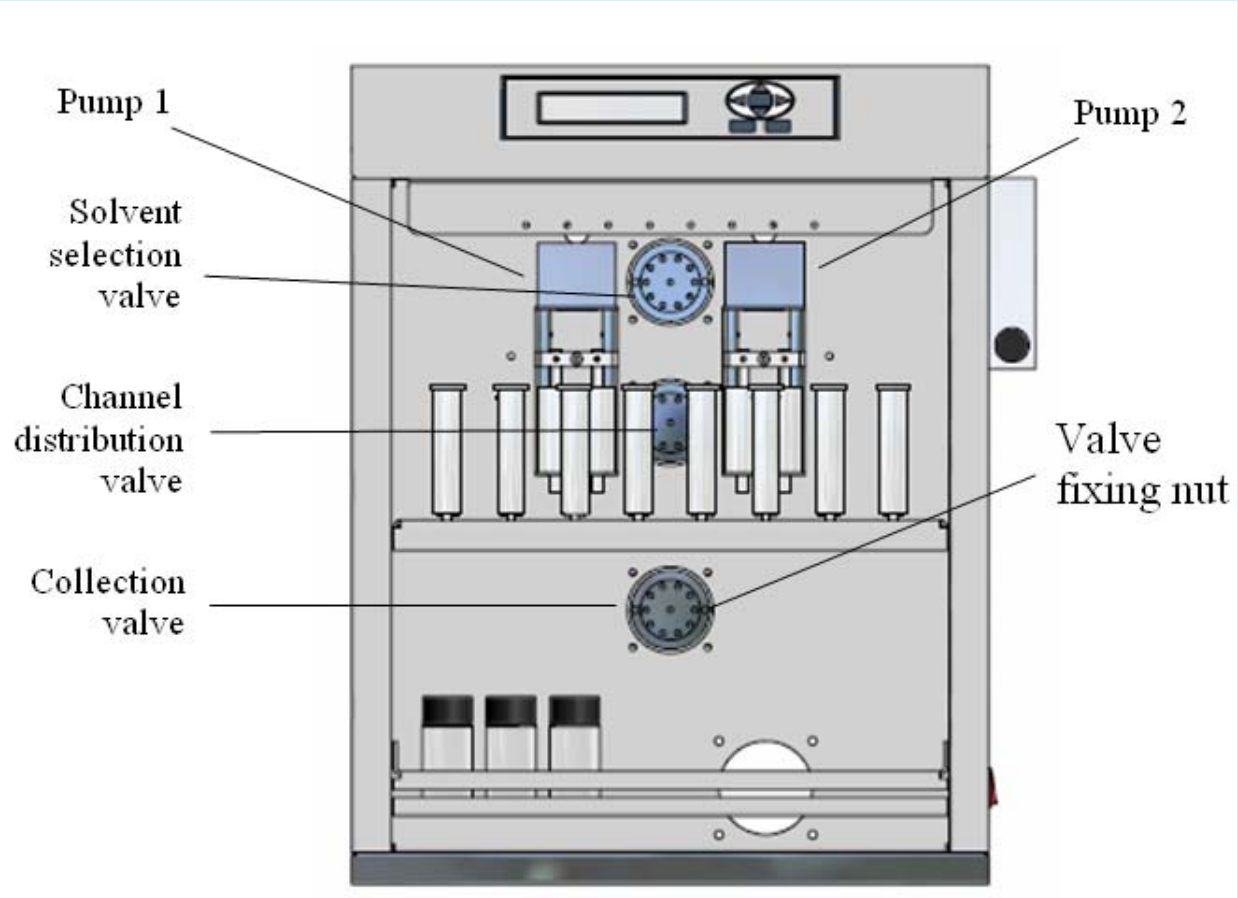
Right: Structure of a 6-channel SPE from PromoChrom. Only two valves are used regardless number of channels



Product 1: SPE-03 8-channel SPE system

1. Process 8 samples in parallel mode
2. Suitable for both large volume water samples and small volume food sample extracts
3. Much smaller size and weight than other multi channel SPE (12 KG)
4. Extra functions: online evaporation after cleanup
5. Robust and easy operation thanks to highly integrated valves

Product 1: SPE-03 8-channel SPE system



The whole system has no XYZ motion components

Product 2: SPE-04 online/offline SPE system

1. Perform both offline SPE and online SPE
2. Use SPE columns available on the market
3. Online derivatization using two reagents and heating after SPE cleanup
4. Easy integration with LC and LC-MS
5. Easy method development

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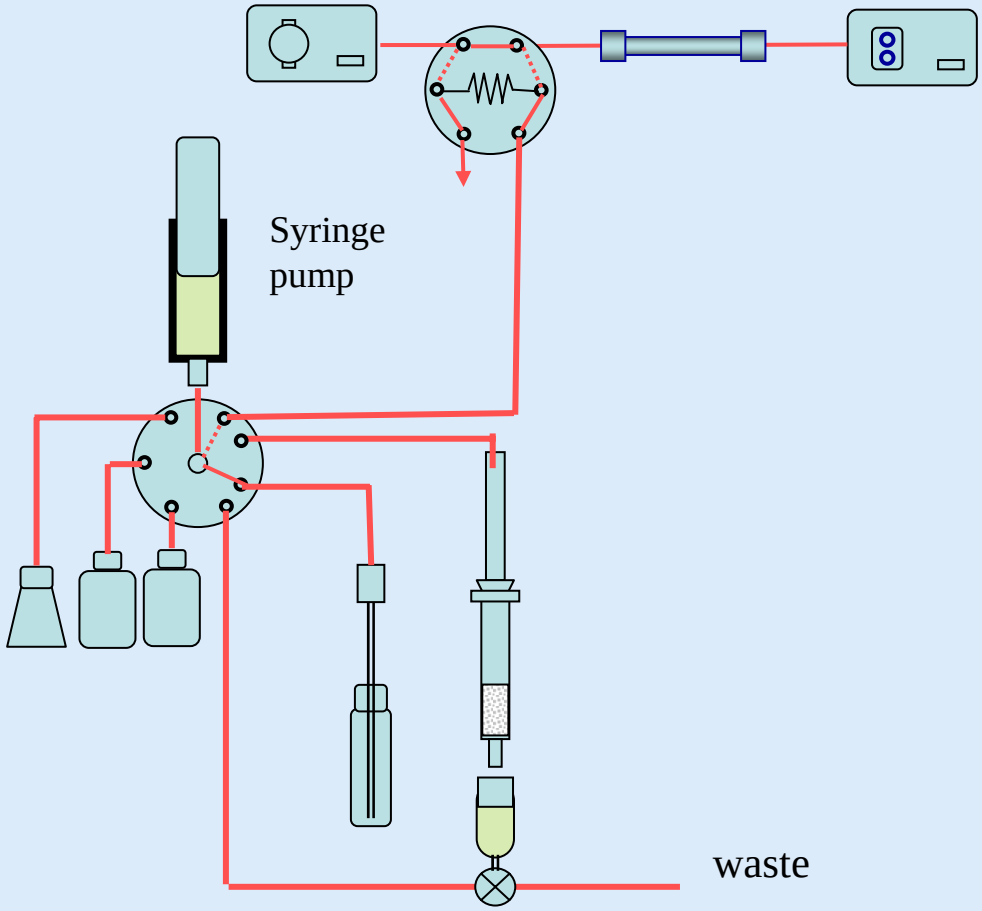
Product 2: SPE-04 online/offline SPE system



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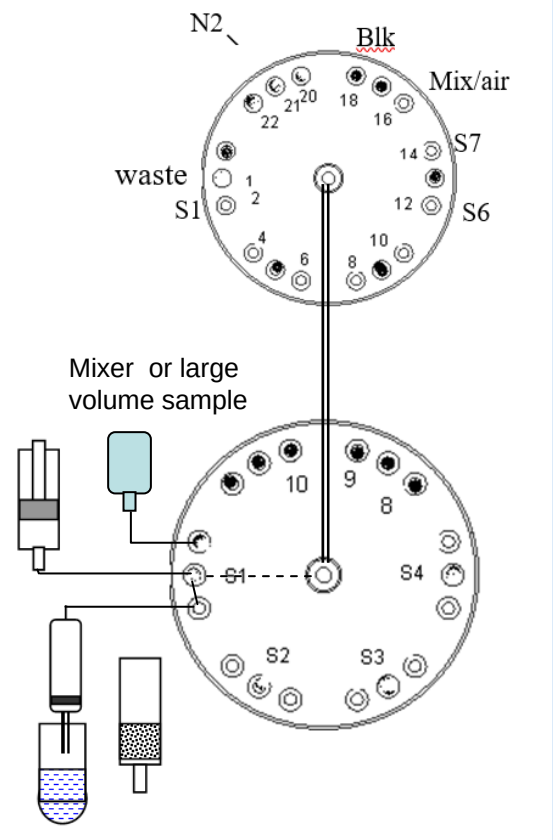
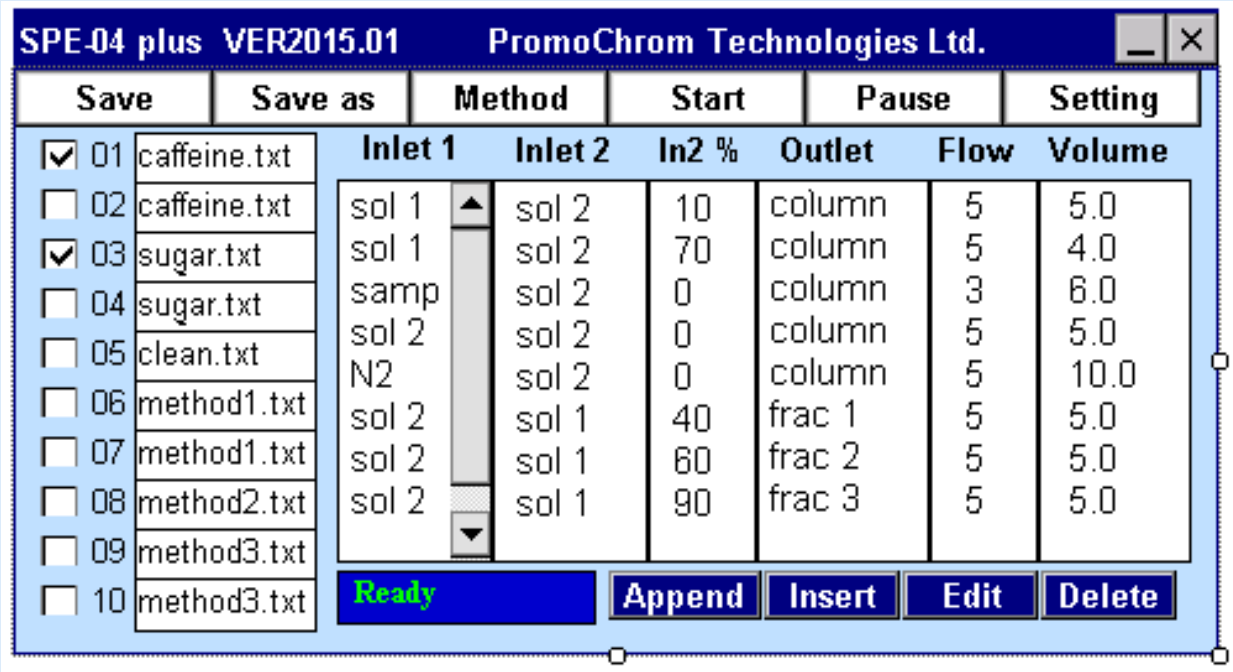
Product 3: SPE-04+ 4 channel SPE system

1. Process 40 samples at a speed 4 times of a conventional SPE system
2. Use 16X100 tube for collection
3. Online mix of two solvents for gradient elution.
4. Needle will follow the level of liquid while taking sample to avoid contamination of plunger
5. Simple structure based on the multifunctional valve
6. Small size with built in touch screen computer

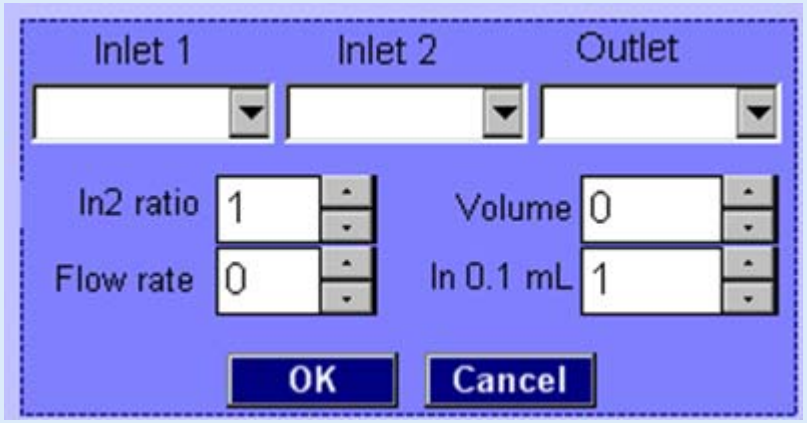


Product 3: SPE-04+ 4 channel SPE system

User interface of the software



Panel for method parameter entry



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Product 3: SPE-04+ 4 channel SPE system

Table 3. SPE Method ("PAM8_L5.spe")						
#	Step	Source	Output	Vol. (ml)	Speed (ml/min)	Liquid sense
1	Condition	0.5% TEA in MeCN	Waste2	5	30	No
2	Condition	0.5% TEA in MeCN	Waste2	5	30	No
3	Load	Sample	Fract1	5.2	9	No
4	Collect	MeCN	Fract1	5	9	No
5	Purge-cannula	MeCN	Cannula	2	30	No
6	Purge-cannula	MeCN	Cannula	2	30	No

Transfer from a Rapidtrace method to a SPE-04+ method.

Inlet 1	Inlet 2	Ratio	Outlet	Flow rat	Volume
Solv 2	Solv 2	0	column	8	10
sample	Solv 2	0	Frac 1	8	5
Solv 1	Solv 2	0	Frac 1	8	5
Solv 1	Solv 2	0	wash	10	10

Product 4: LC-03 online SPE system

1. Dedicated to water analysis
2. Achieve better sensitivity and much faster speed than offline SPE for large volume water extraction
3. Sample extraction and LC analysis are performed parallel (no waste time)
4. Computer is not necessary
5. Include SPE column, LC column and methods as a ready solution

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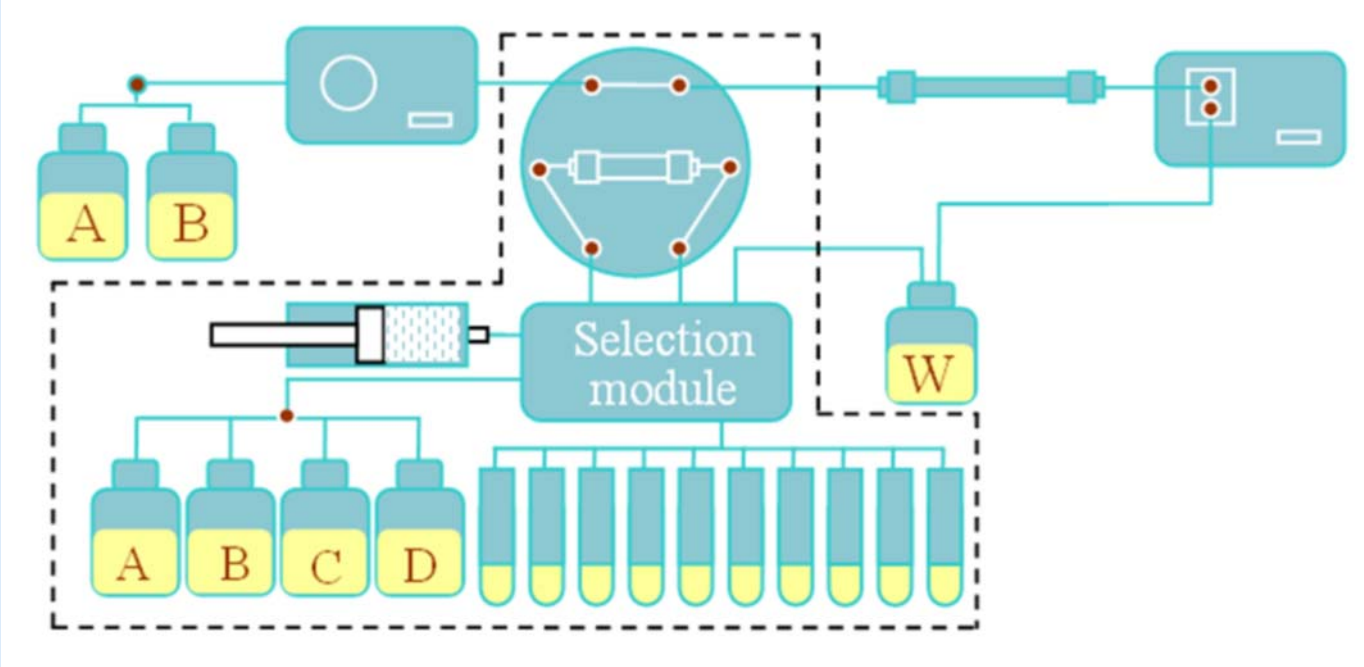
Product 4: LC-03 online SPE system

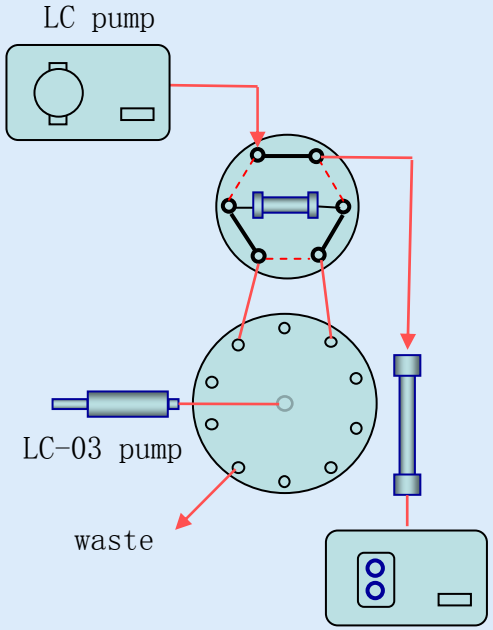
Working principle



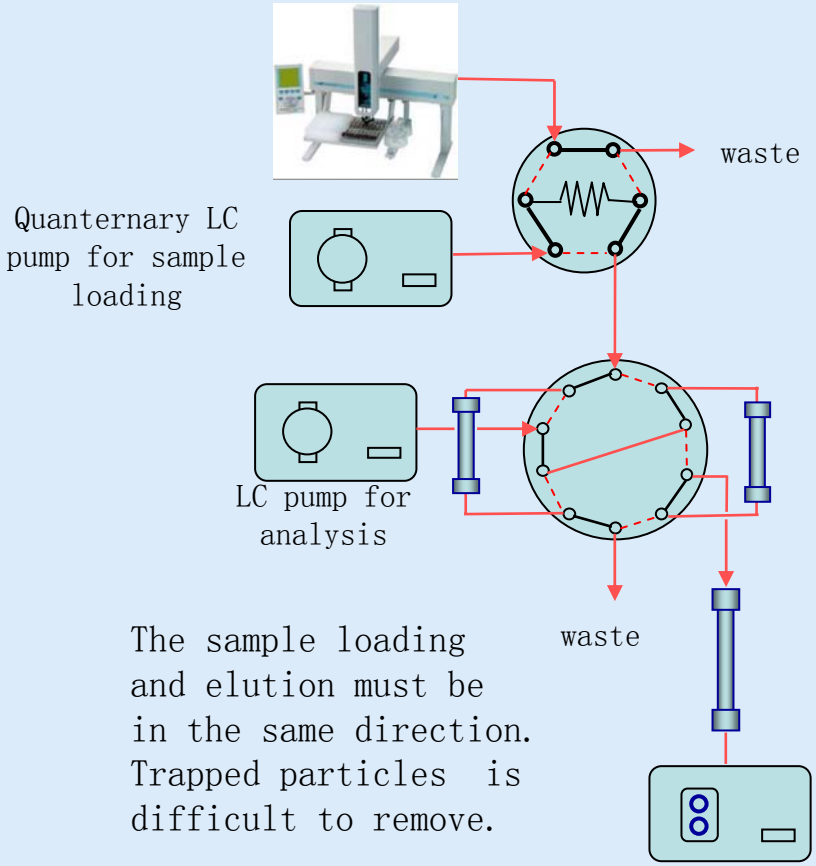
Activate SPE column → Load sample 10-20 mL → Rinse SPE column in opposite direction → Switch injection valve and trigger LC

Product 4: LC-03 online SPE system

Compare with other solutions on the market



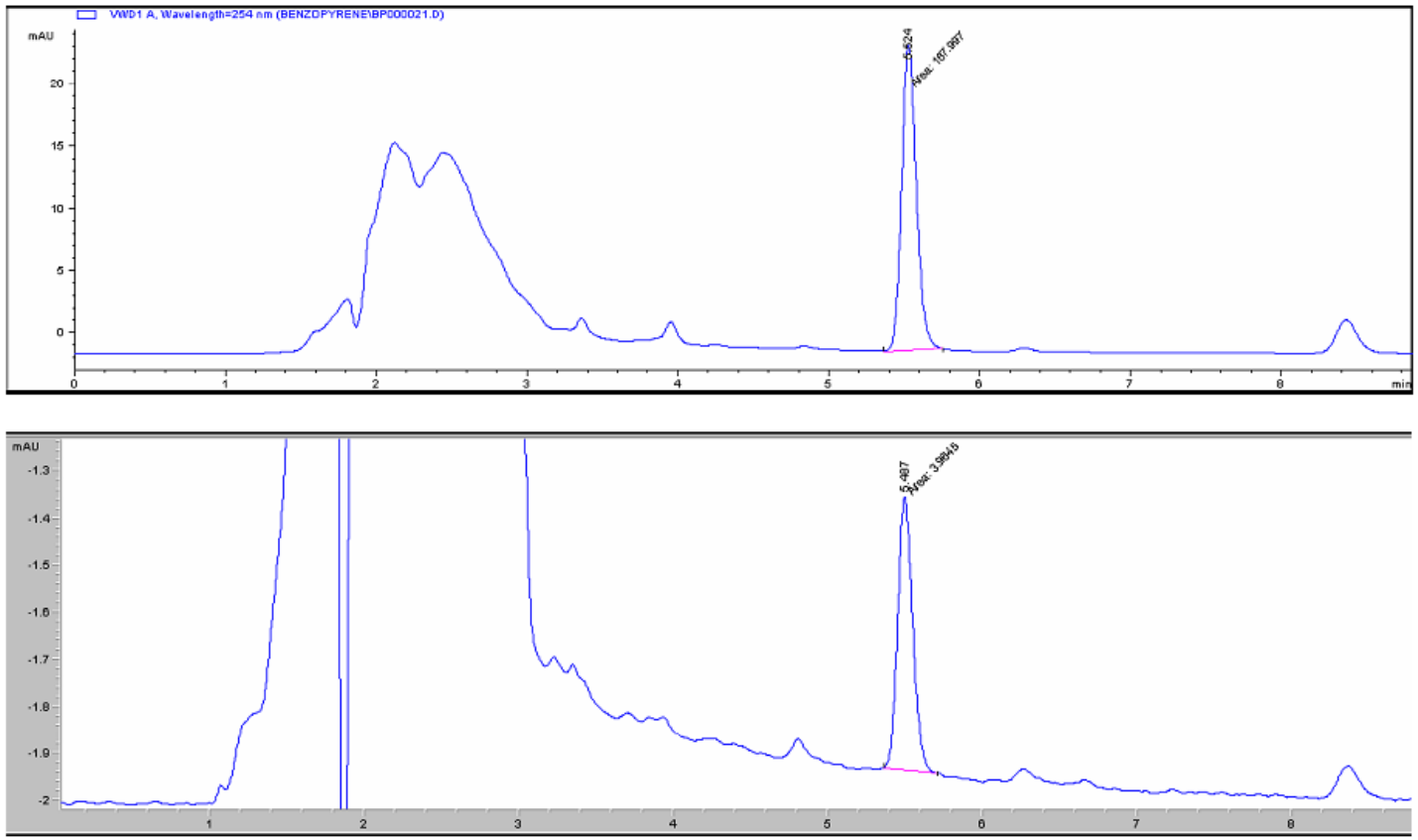
LC-03: The pump can elute the SPE column from two directions. I can easily remove particle without using filter and keep a long lifetime for the SPE column.



The sample loading and elution must be in the same direction. Trapped particles is difficult to remove.

Product 4: LC-03 online SPE system

Example for analysis of benzopyrene in tap water with UV detector



Top: 2.5 ppb in 20 mL water sample
Bottom: 25 ppt in 40 mL water sample

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