

Fast and Selective Purification of a Fluorous Radiotracer

using AFFINIMIP® SPE ¹⁸F based on Molecularly Imprinted Polymers SPE



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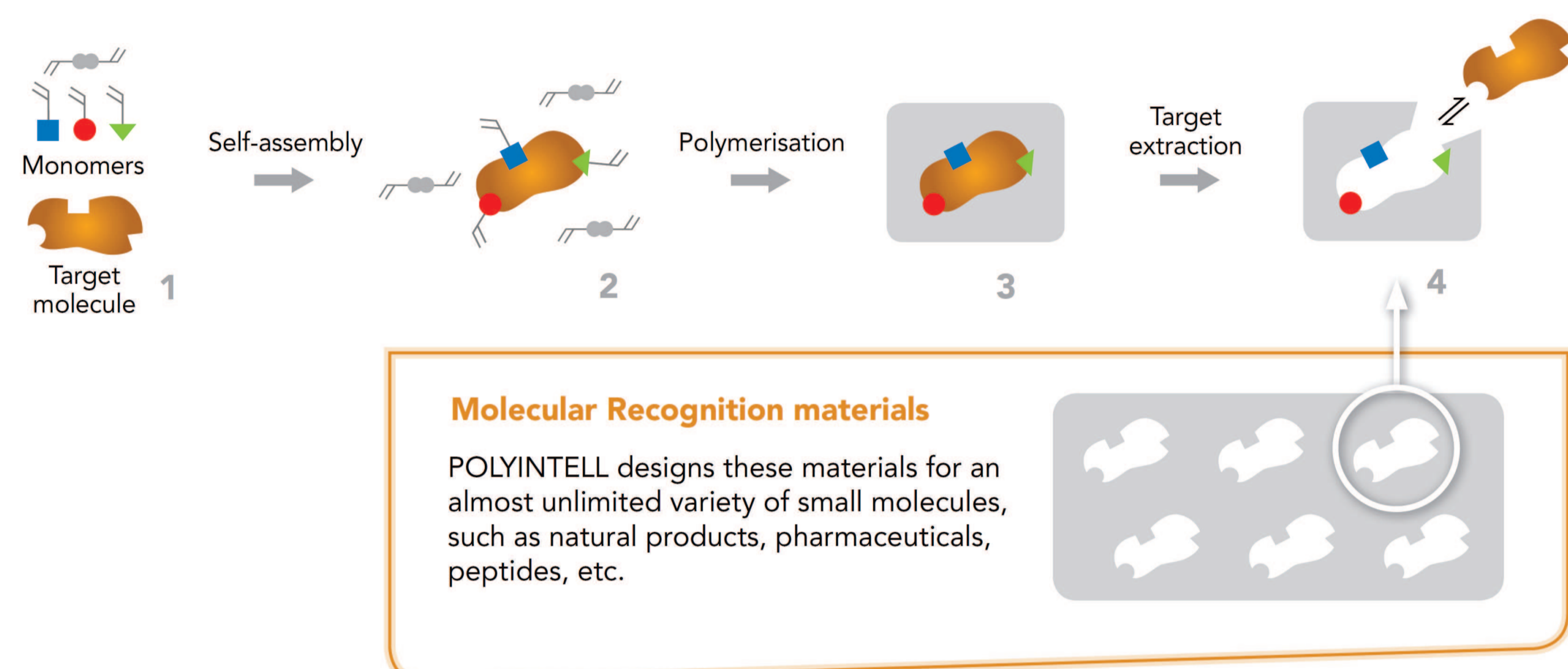
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In Fluorine-18 chemistry, separation between the precursor and the corresponding radiotracer is difficult. Rapidity and efficiency are required to facilitate the purification of the fluorous radiotracer due to the radiotracer lifetime.

We developed new solid phases for purification of ¹⁸F radiotracers in a SPE format easily adaptable for automation. These new solid phases are based on **Molecular Imprinting Polymers** using a simple, easy and fast clean-up protocol.

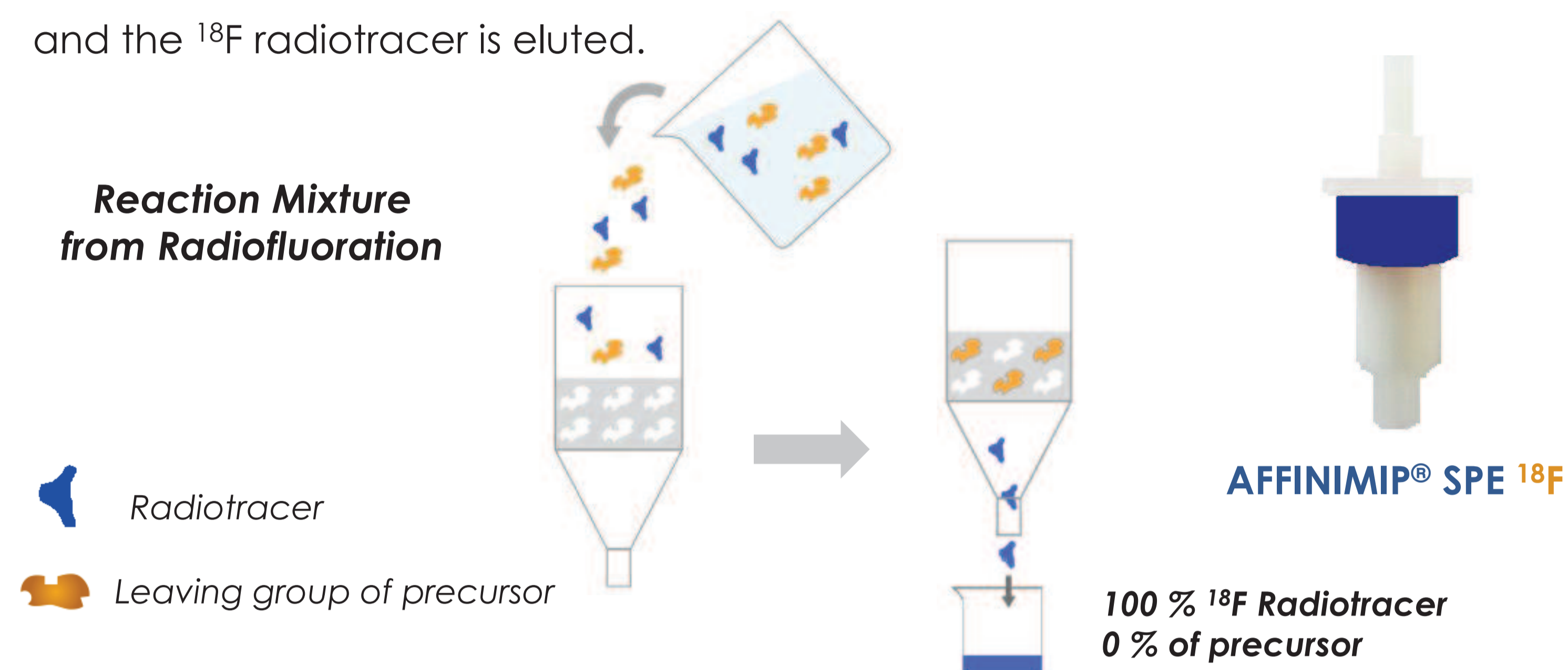
Principle of AFFINIMIP® SPE

Based on molecularly imprinted polymers, AFFINIMIP® is a three-dimensional network that has a « memory » of the shape and functional group positions of the template molecule.



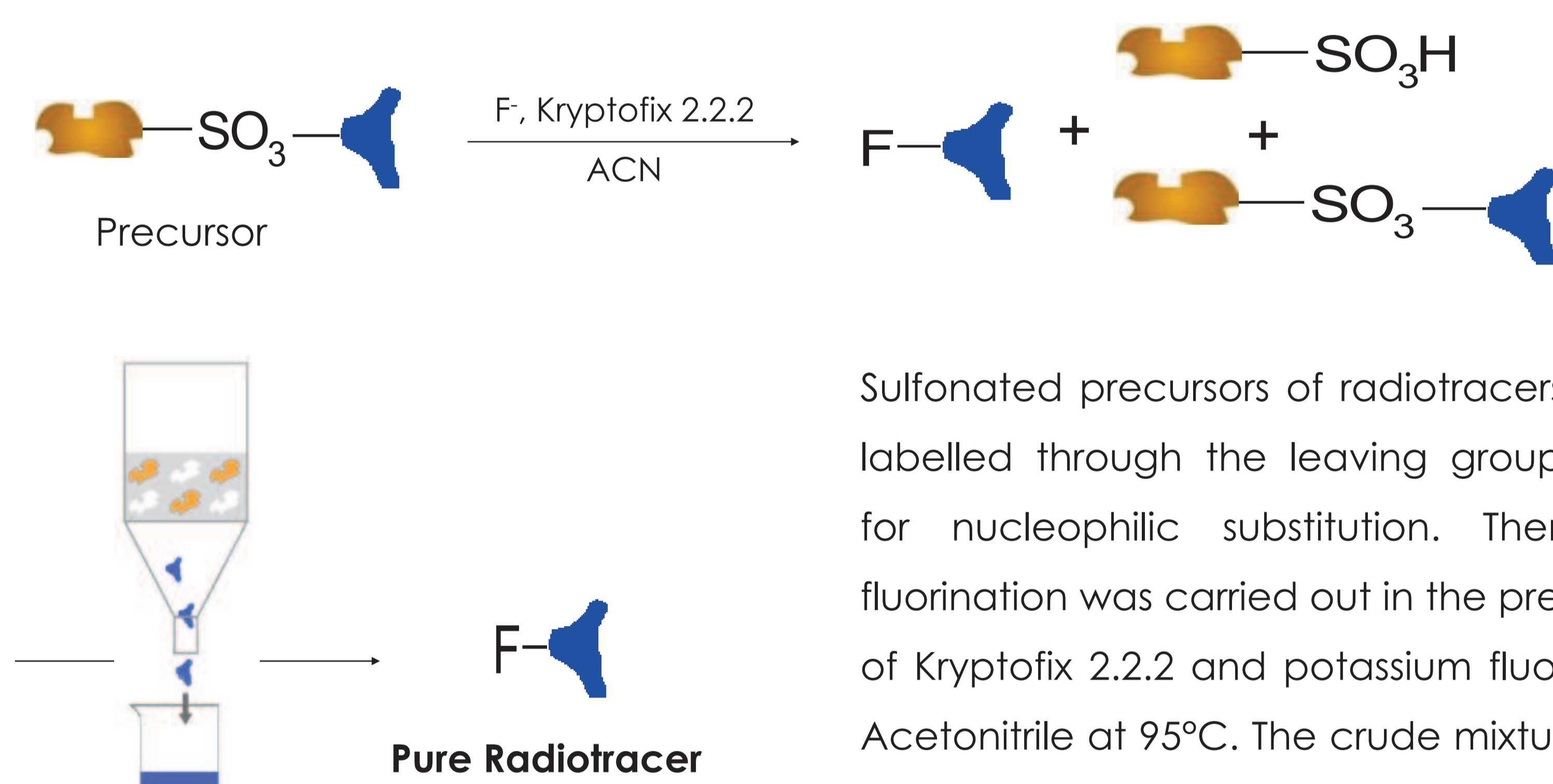
Application of AFFINIMIP®SPE ¹⁸F

POLYINTELL developed a fast and powerful method for purification of ¹⁸F radiotracer using the affinity of molecularly imprinted polymers for a leaving group of precursor. The access to ¹⁸F radiotracer is done after a simple purification with AFFINIMIP®SPE ¹⁸F. Using this procedure, the precursor is retained on the cartridge and the ¹⁸F radiotracer is eluted.



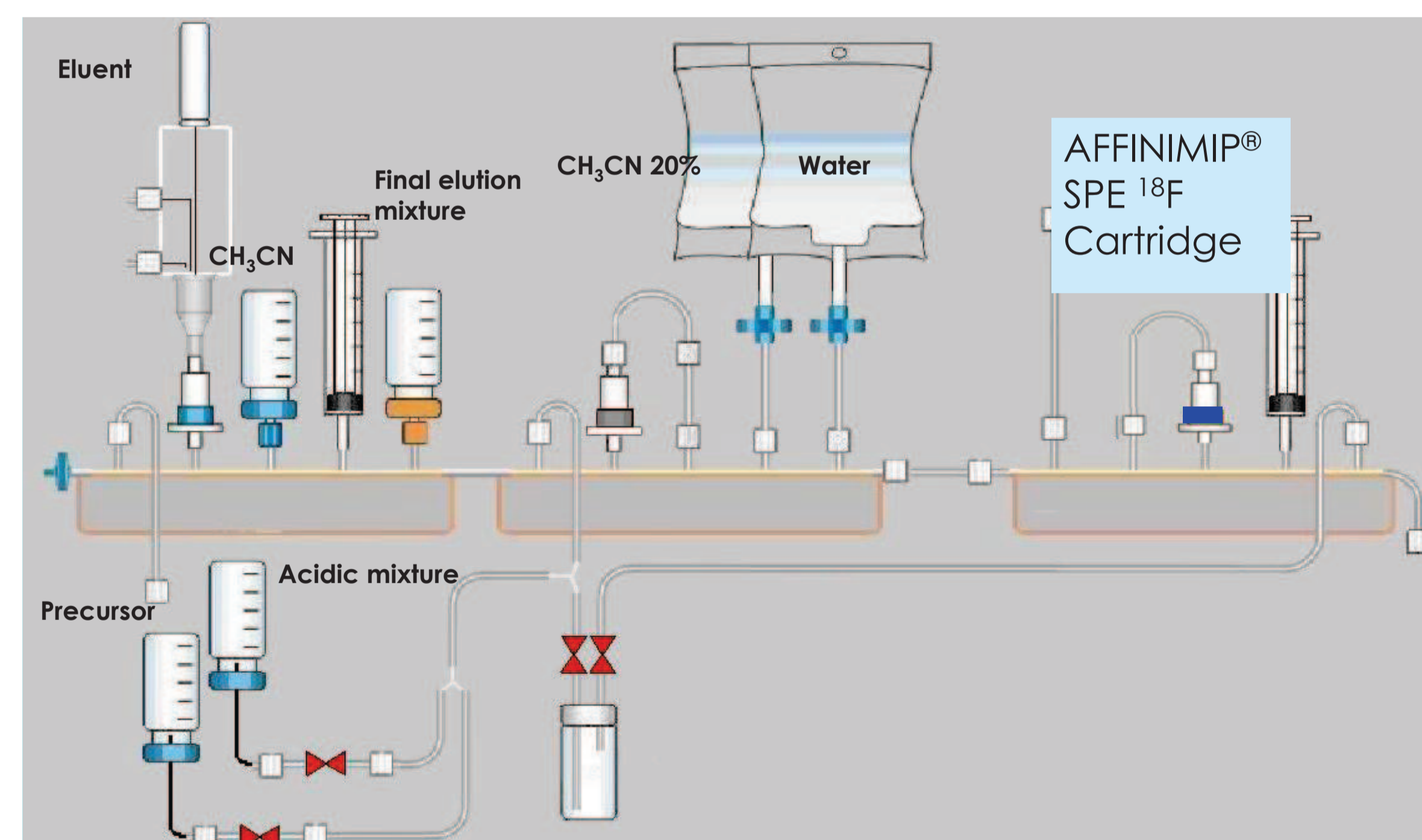
Methods

Solid phase extraction of the radiotracer from the crude mixture using a Molecularly Imprinted Polymer SPE cartridge specific to the labelled group is described here :



Sulfonated precursors of radiotracers were labelled through the leaving group used for nucleophilic substitution. Then the fluorination was carried out in the presence of Kryptofix 2.2.2 and potassium fluoride in Acetonitrile at 95°C. The crude mixture was loaded on the SPE cartridge and the cartridge was washed with Acetonitrile.

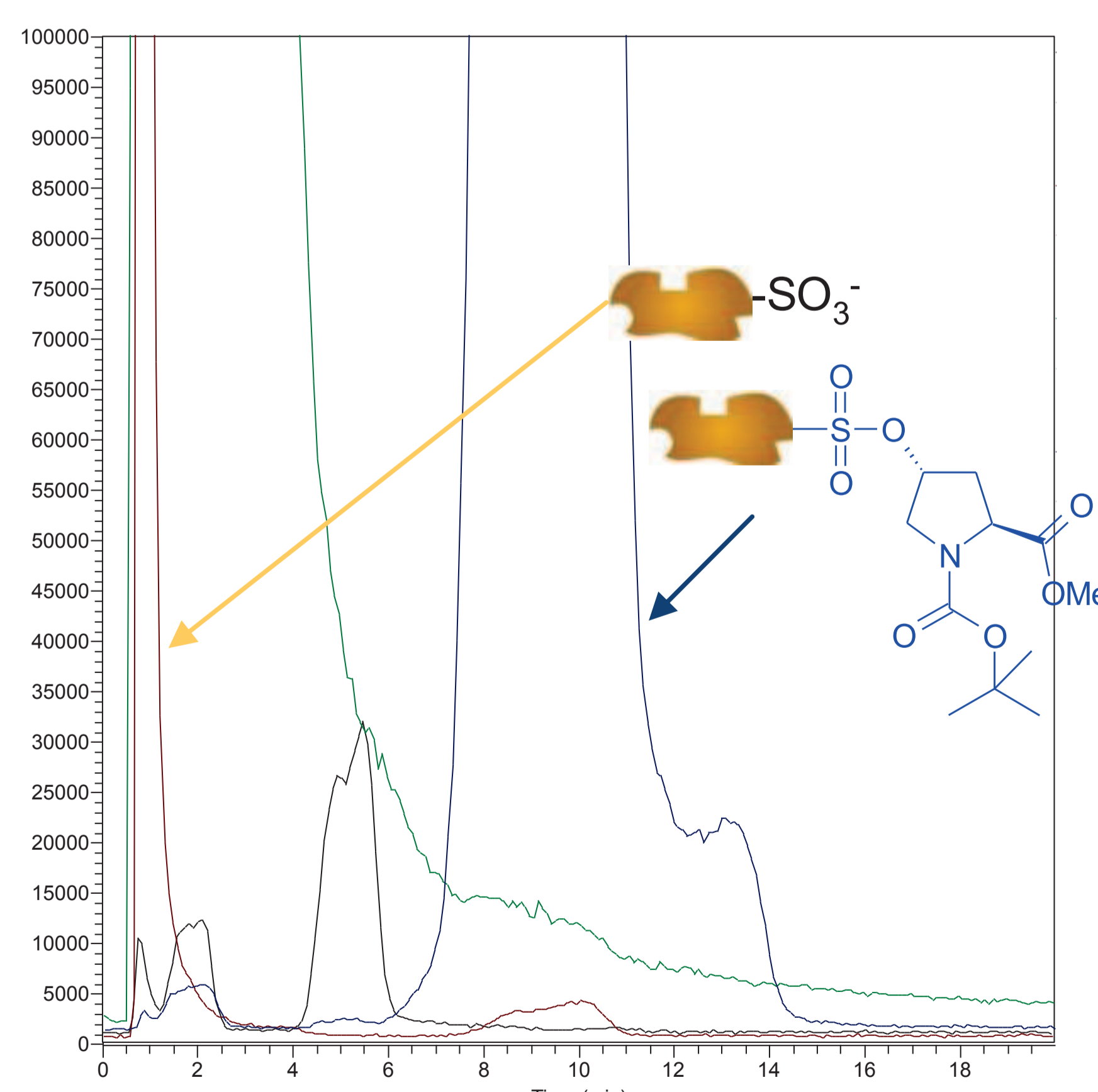
[¹⁸F]-FPROLINE: Automated cassette



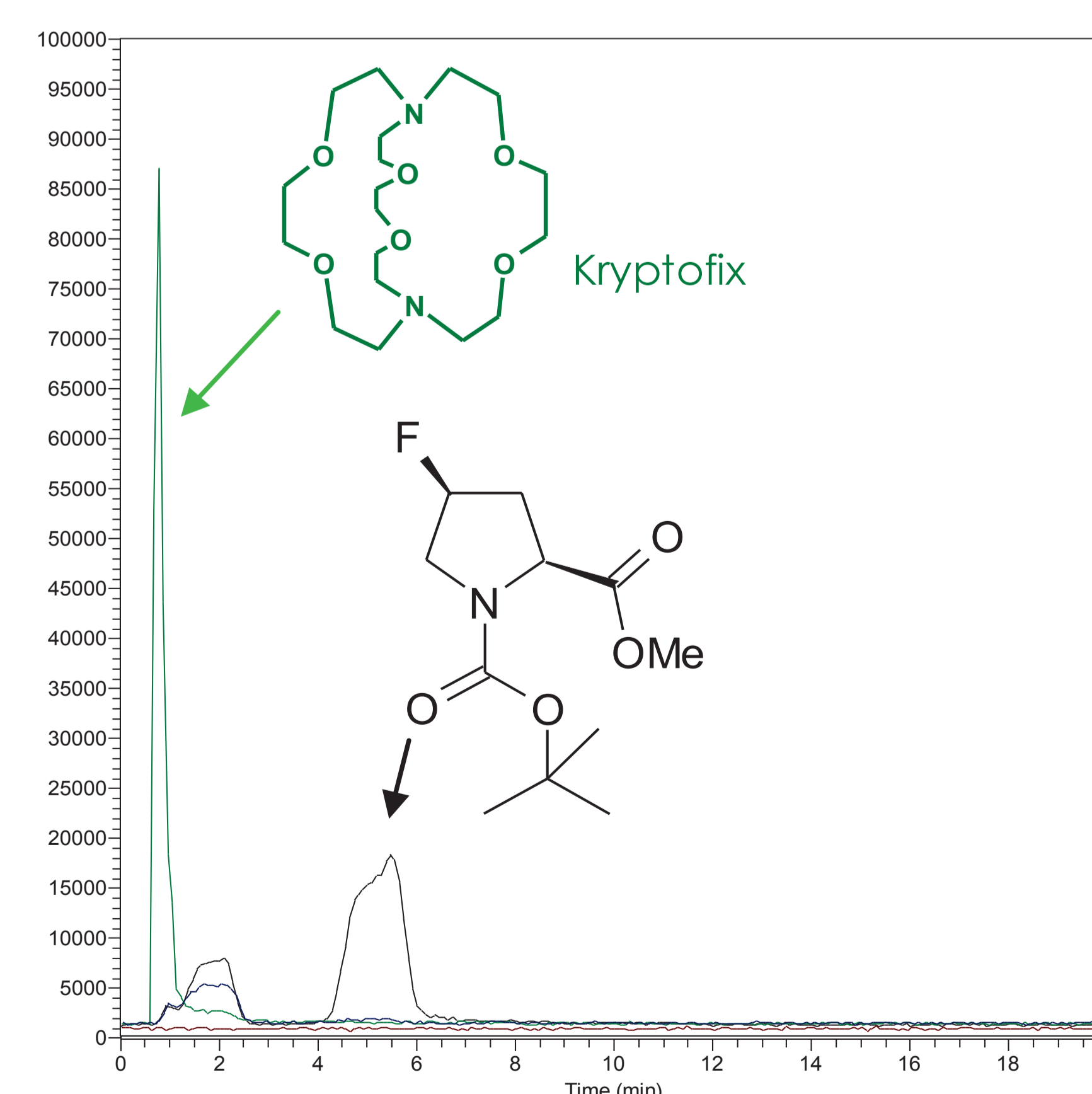
Results

Rapid and simple purification of radiotracer

The HPLC-MS analysis shows that the first Acetonitrile fractions were constituted of the radiotracer (more than 95 % recoveries) and **no trace of the precursor and of the sulfonic acid were detected.** Thus via the leaving group of the precursor, **a fast and selective purification can be realised using a Molecularly Imprinted Polymer SPE leading to the fluorous radiotracer.**



Selected Ion Monitorings of Kryptofix 2.2.2, proline, fluoro-proline and sulfonic acid before purification on AFFINIMIP®SPE ¹⁸F



Selected Ion Monitorings of Kryptofix 2.2.2, proline, fluoro-proline and sulfonate after purification on AFFINIMIP®SPE ¹⁸F

Conclusion

We developed a new method based on Molecularly Imprinted Polymers allowing to access to fluorous radiotracers without any contamination of the precursor. This method was successfully tested on an automated cassette for the purification of [¹⁸F]-Proline. High radiochemical purities near 100 % were obtained.

