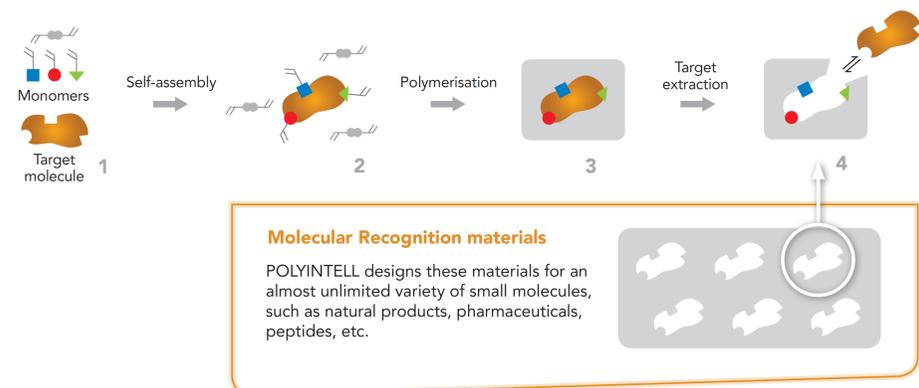


In radiotracers chemistry, the method of purification is a key aspect in radiopharmaceutical production and long purification steps must be avoided. The method must be effective enough to ensure a high level of radiochemical purity and fast enough due to radiotracer lifetime. Preparative HPLC is being replaced by Solid-Phase Extraction (SPE) which is a time-effective method for purification of radiotracers from precursor and impurities.

We developed new solid phases for purification of ^{18}F radiotracers in a SPE format easily adaptable for automation. These new solid phases are based on **Molecular Imprinting Polymers**. Then a simple, easy and fast clean-up using these phases has been developed to have access to high quality ^{18}F radiotracers.

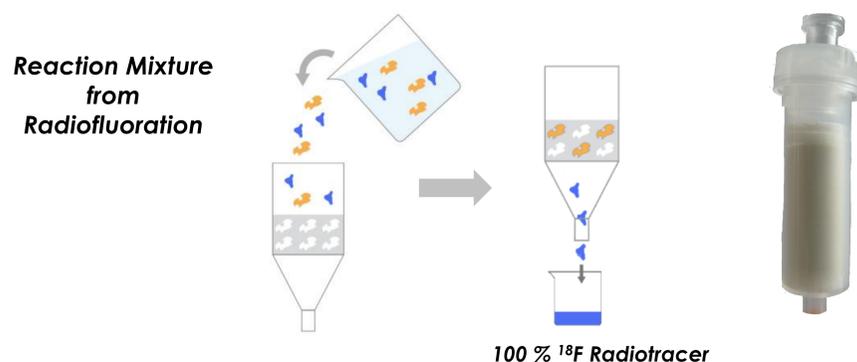
Principle of AFFINIMIP®

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.



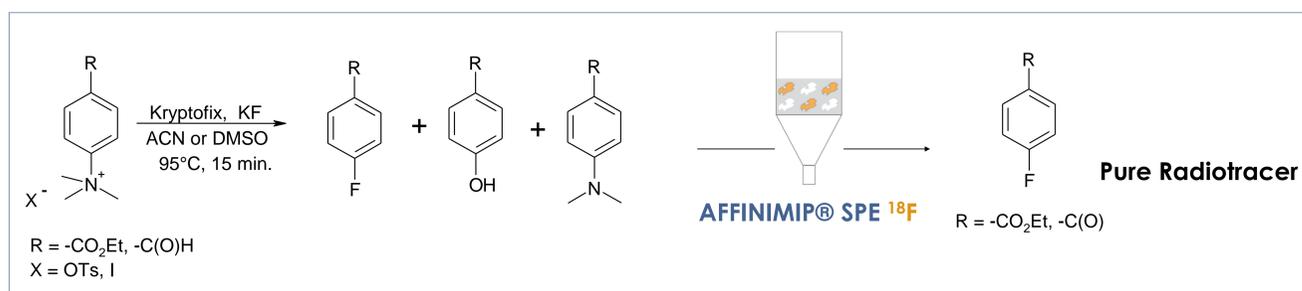
Application of AFFINIMIP® ^{18}F

POLYINTELL developed a new range of AFFINIMIP® SPE cartridges dedicated to the purification of fluorous radiotracers. Aliphatic/aromatic nucleophilic fluorinations have been explored. The access to ^{18}F radiotracer is done after a purification with AFFINIMIP® SPE ^{18}F . The precursor/residual ^{18}F /Kryptofix/known impurities are retained on the cartridge and the ^{18}F radiotracer is eluted.



Methods

Solid phase extraction of the fluorous radiotracer from the crude mixture issued from an aromatic nucleophilic substitution using a Molecularly Imprinted Polymer SPE cartridge is described here.

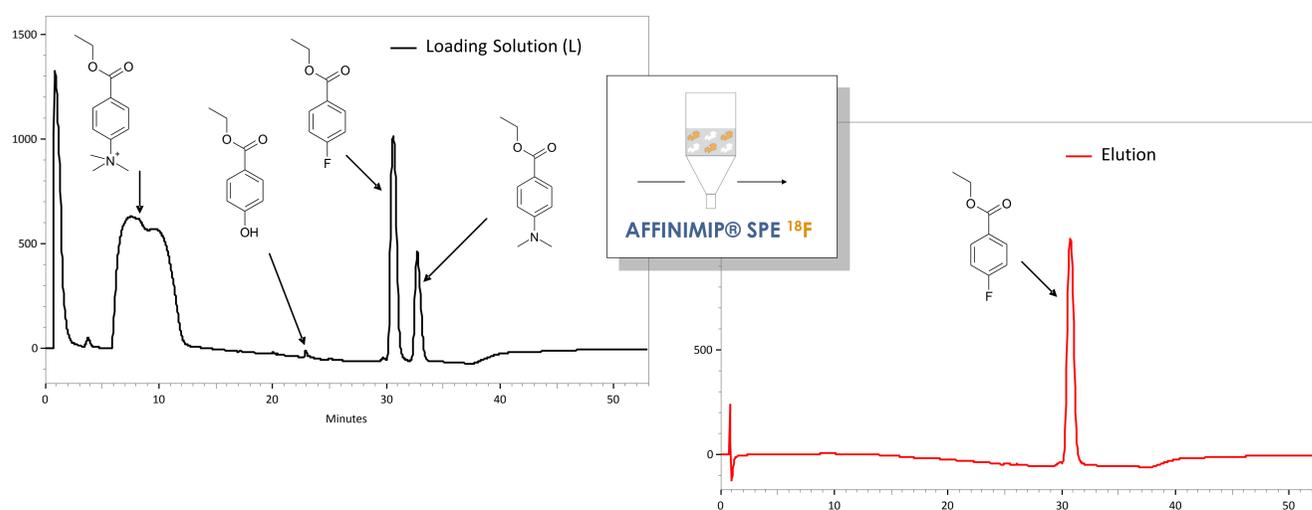


SPE Protocol

Steps	Solvents
Loading	Crude mixture diluted with water
Washing	Water-ACN (80-20)/ Water
Elution	ACN or Ethanol

Results

Rapid and simple separation of the radiotracer from precursor/impurities



Benefits

- Rapid and simple radiotracer purification: no need for a preparative HPLC thanks to our All-in-One SPE.
- Increased reliability of radiotracer production : reduction of manual handling steps
- Improved radiotracer purity: no cross contamination thanks to single use cartridges
- Validated for radiotracers issued from a $\text{S}\text{N}_{\text{Ar}}$ with an ammonium precursor

The HPLC-UV/MS analysis shows that the elution fraction was constituted of the radiotracer (more than 95 % recoveries) and **no trace of the precursor or other identified compounds** were detected. **More than 95 % of Kryptofix 2.2.2** was also eliminated (MS control). **Residual ^{18}F was retained** on the cartridge. Thus, a fast and selective purification can be realised using a Molecularly Imprinted Polymer SPE leading to the fluorous radiotracer.

Conclusion

We developed a new phase based on Molecularly Imprinted Polymers allowing to access to fluorous radiotracers without any contamination of the precursor or known impurities. Cartridges were successfully tested on an automated cassette for the purification of two different radiotracers. High radiochemical purities near 100 % were obtained. The same strategy was successfully realised for the aliphatic nucleophilic substitution where the recognition is based on a labelled moiety on the precursor. POLYINTELL commercializes other conventional cartridges dedicated to radiotracers purification (HLB, C18, SAX, SCX etc....) in a ready-to-use format for automates.