Synthra C-11 Family

Product Description and Technical Specifications

Synthra MeIplus Research (Catalog No. 003r)

Synthra MeIplus Research is a flexible and completely automated radiosynthesizer for the efficient production of [^{11}C]labeled compounds based on the generation of gas-phase production of [^{11}C]methyl iodide and [^{11}C]methyl triflate. It is specially designed to perform the required multi-step synthesis e. g. for using [^{11}C]propylation. Automating the synthesis is simple, with the easy-to-use configuration software SynthraView. The Synthra MeIplus Research module offers both, fully automatic and manual modes of operation.

Gas Phase Capabilities

✓ High specific activities are achieved from in-target produced [^{11}C]CO_2 ranging from 5 Ci/µmol to 20 Ci/µmol (Higher specific activities are possible when using methane target).

The [^{11}C]CO_2 produced in target is quantitatively trapped in the stainless steel capillary tubing at -180 °C. Subsequently, the [^{11}C]CO_2 is released into the methane oven where it is converted to [^{11}C]CH_4 by reduction on a Ni-catalyst. The [^{11}C]CH_4 is trapped at -120 °C on Carboxen®. In a successive gas phase reaction the iodination of [^{11}C]CH_4 to [^{11}C]MeI is carried out in a gas phase recirculation system with gaseous I_2 at 730 °C. During circulation [^{11}C]MeI accumulates on a Porapak™ column. Finally, it is released at 200°C and ready for any kind of labeling reaction.

[^{11}C]Labeling Possibilities

- **[^{11}C]Methyl iodide production**: [^{11}C]MeI is ready for release 7 minutes after trapping the [^{11}C]CO_2. The yield for the [^{11}C]methyl iodide formation is under good conditions above 50 % non-decay corrected (ndc).
  - Up to 10 sequential methyl iodide preparations are possible from a single box set-up.

✓ **Methyl triflate production**: The [^{11}C]MeI can be converted to [^{11}C]MeOTf by passing through a silver triflate filled column at 180 °C. The conversion yield from methyl iodide is 95 %.

- Both [^{11}C]MeI and [^{11}C]MeOTf can be used for solid support heterogeneous reactions (e. g. [^{11}C]choline, [^{11}C]methionine) or can be released into the reaction vessel for homogeneous reactions.

✓ **Acetate production**: The purified [^{11}C]CO_2 is passed into the reaction vessel for Grignard reactions.

General Features

✓ **Heating and cooling capabilities**

- Nine heating zones
- Six with cooling capabilities
- Temperature range: -196 °C – 950 °C

✓ **Detectors and controllers**

- Six shielded radiation detectors
- Three electronic flow controllers (HCN option: Four flow controllers)
- Four Pressure sensors

✓ **Dispensers and valves**

- HR-dispenser (up to 50.000 steps, 2.5/5 mL)
- HPLC pneumatic injection valve (0.5 mL to 2.5 mL sample loop)
- Five spare valves for customization
- Chemically inert valves with small dead volume < 35 µL, 5 bar rated

✓ **Self-cleaning system option**

✓ **Dimensions** (w x d x h): 55 × 50 × 48 cm

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- ✓ **Weight**: approx. 40 kg

Synthesis Features

- ✓ **Two closed reaction vessel** (-196 °C – 200 °C) with integrated cooling to reduce synthesis time
  - 3 mL reaction vessel (minimum volume: 50 µL)
- ✓ **Triflate/column oven** (RT – 200 °C)
- ✓ **Ten reagent vials**
  - Eight small (1 – 3 mL) and two large (10 - 15 mL) volume glass vials for reagents
- ✓ **Three additional cartridge holders**
- ✓ **Built-in preparative radio/UV-HPLC system** for in-process purification and final product collection (max flow: 40 mL/min)
  - Fixed wavelength detector with 255 nm or 280 nm
  - Quaternary gradient
  - One HPLC semi-preparative column
- ✓ **SPE unit** for final product formulation

Additional Synthesis Options

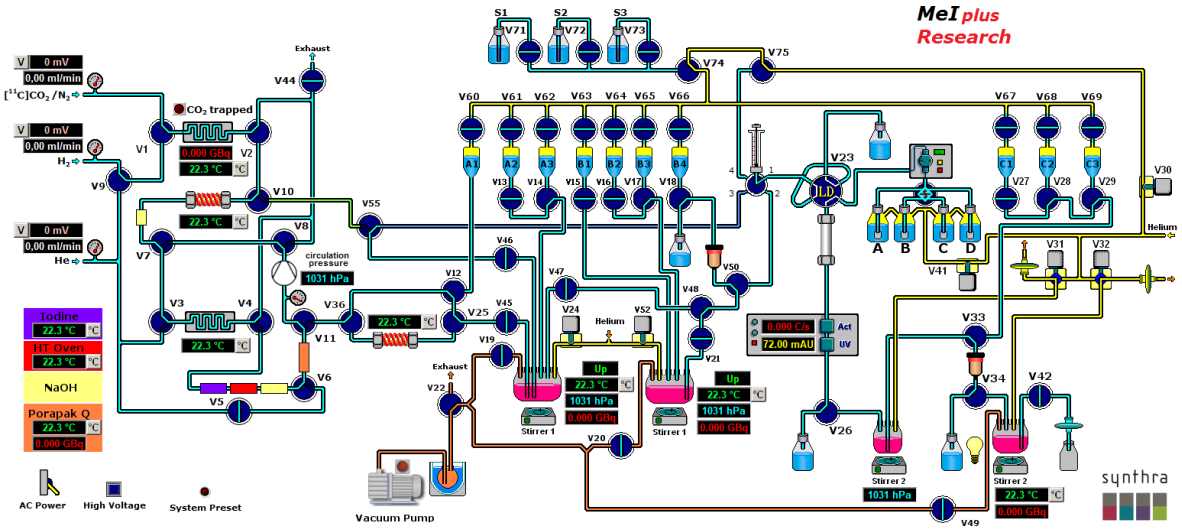
- ➔ **Methane option**: A reduced gas phase suitable for the use of CH_4 target
- ➔ **[^{11}C]CO option** (Catalog No. 003co): After purification, the [^{11}C]CO_2 is released into the column oven for Zn- or Mo-catalyzed reduction to [^{11}C]CO.
- ➔ **[^{11}C]HCN option** (Catalog No. 003hcn): The [^{11}C]CH_4 is released with NH3 gas into a high temperature area where it undergoes a Pt-catalyzed conversion into [^{11}C]HCN at 950 °C.
- ➔ **Loop option** (Catalog No. 003lo): A heatable and coolable reaction loop is integrated in the synthesis route to reduce synthesis time.
- ➔ **Product solvent evaporator** (Catalog No. 000pse)
- ➔ **Variable wavelength UV detector** (Catalog No. 000vuv)

GMP Features

- ✓ Synthesis files for several [^{11}C]radiotracers available
- ✓ **GMP compliant.** Electronic control and data collection (27/18 channels)
- ✓ **21CFRpart11** & **LIMS** compatible

Terminal Control

- ✓ A laptop (Win 10 Pro) with preinstalled controlling software SynthraView is included
- ✓ Four digital inputs for communication with external devices upon request



The Graphical User Interface (GUI) of the SynthraView software.

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