



Benzene line: equipment, laboratory setup and staff training

Benzene line

is Chemical Equipment Set which is developed to produce benzene sample used to determine Radiocarbon content.

Conventional Radiocarbon Dating Method based on liquid scintillation counting (LSC) benzene uses benzene as counting medium. Thus Benzene line easily produces of 0.1-7.0 g benzene per sample depending on amount of available datable Carbon.



New lab (Poland, 2014, press to enlarge)

Benzene Line Concept is:

- Creation and use vacuum line of minimum volume based on: Teflon, Stainless Steel, Titanium and Boron-Silicate Glass as materials.
- Introduce Technology of VacuumPyrolysis and Cryogenic Trapping for: Controlled Transfer and Transport line of All Substances in the Benzene Line during of benzene probe preparation.

Commercial offer includes:

- Shipment of Chemical Laboratory Equipment Set, Transfer of Corresponding Technology, Lab Installation and Staff Training.

Benzene line consists of:

- High temperature (High T) and Low temperature (Low T) processes modules and [Ultimate Teflon vials for C-14 LSC](#).

High Temperature set serves for:

- Charring of wood, peat, humic acids, collagen etc.
- Production of Li-carbide,
- Carrying of [Vacuum pyrolysis](#) - the direct chemisorption into a Li alloy of carbonaceous gases produced by the controlled thermo-destruction of organic materials under vacuum conditions.

All above technologies widened applicability of Conventional Carbon Dating for different kind of sample materials.

Reaction vessel is the Heart of Benzene Line.

- It is covered with hermetic vacuumed and water cooled head and it works at 750 - 850 °C as it was described serving for [Vacuum Pyrolysis](#) at 1998 [[Skripkin and Kovaliukh, 1998](#)].
- It serves to synthesize lithium carbide by performing of chemical transformation reactions using **C** of any kind of carbon containing studied material and lithium metal.
- It is involved in the **High T** and **Low T** processes.

Low Temperature Set serves for:

- Acetylene production, its criogenic catching and purification and by-compacting
- Benzene synthesis using of super effective catalyst, criogenic catching, purification by sulfuric acid treatment and by sublimation.

General LSC technique:

- Recommended [Teflon vials](#) have superior technical performances: high measurement efficiency, low background and low benzene leakages, extreme long durability for optimal C-14 LSC (spectrometry) in benzene.

Thus [application](#) of Teflon flasks especially for [small samples of benzene](#) enables excellent performances for C-14 LS measurement:

Some parts of **Benzene Line** ([benzene synthesizer](#)), **particularly traps** could serve as **portable C-14 dating equipment** which are used to collect carbon dating sample materials like **CO₂** and **carbonates**.

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