



Benzene line: equipment, laboratory setup and staff training

Benzene Line Technology

Conventional method which we use radiocarbon dating is based on benzene as optimized media for liquid scintillation counting.

We use some base ideas of benzene synthesis for sample preparation.

We take care about some problems arising in glass benzene lines, like - It is too hard to keep it hermetic large internal volume vacuum line.



Laboratory glass reaction vessels

Initial ideas were published [1, 2] and all future developments came to our customers included in materials used in Benzene line, and knowledge given in user's manual and during of staff training. Our general approach is to optimize volume (diameter and length) of benzene line and use some other material - Teflon, titanium, stainless steel, and boron-silicate glass. In addition we could connect ionizing air (ozone) for cleaning of line in case. We produce highly effective long lasting chromium based catalyst which is reusable and applicable for continuous work. Thus set of equipment offered includes catalyst required for at least two years of intensive work.

- **High quality tubes** of three different diameters allow [producing glass reaction vessels](#) with cone connections.
- **Boron-silicate glass** tubes are used to produce glass reaction vessels applicable for all stages of sample conversion in benzene line.
- **Cone connections** allow simply connect / disconnect any of glass reaction vessels with Teflon holders equipped with corresponding's.
- **Glassware production** of laboratory glass reaction vessels, includes following main steps: cone formation, cone tuning, and formation of tube bottom.
- **Working temperature range is** : -200 °C to +600 °C.

Besides we use modern approaches in sample processing like cryogenic trapping and

sublimation and [vacuum pyrolysis](#), [capsule technology](#) , [microliner thermodestruction technology](#). All it allow variety of novel [application](#) of benzene line: radiocarbon dating, estimation of environment and tests of bio-based content. Moreover one could use benzene line for tritium analyses as it allows to achieve better counting performances for low level tritium measurement using any of LS spectrometers.

Thus our equipment includes:

- Combined Anticorrosive Metal Reaction Vessels - highly effective and productive.
- Optimized vacuum line: stainless steel tubes, Teflon holders-connections
- High Performances Glass reaction vessels serving as bubbler, reactor and/or vacuum trap.
- Teflon Vials - high performances and long durability.
- Vertical ovens working highly effective at temperature of 500 or 700 or 800 °C.
- Catalyst - highly effective and reusable.

All that allows us to get long duration working cycle for all equipment set.

Video set:

1. [Laboratory glassware production](#)
2. [Acetylene production and purification](#)
3. [Benzene production. Tears](#)

REFERENCES

1. [Vadim V Skripkin, Nikolai N Kovaliukh. Recent developments in the procedures used at the SSCER Laboratory for the routine preparation of lithium carbide. RADIOCARBON. Vol 40, No 1 \(1998\)](#)
2. [Michael Buzinny&VadimSkripkin. Newly Designed 0.8-ML Teflon Vial for Micro-volume Radiocarbon Dating.RADIOCARBON. Vol 37, No 2 \(1995\) PP. 743-747](#)
3. [VV Skripkin, MG Buzynnyi. Teflon Vials For Precise C-14 in Benzene Measurements by LSC Technique Biological and Chemical Research 4 \(Issue 9\), \(2017\) 229-233](#)

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