

## Toluene: Bromination in the nucleus

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### Principle

Bromine is polarised and, thereby, activated by zinc chloride as a Lewis acid. It can attach itself in an ionic manner to the toluene nucleus via several complex intermediate stages. Following a dehydrobromination, bromotoluene is formed, i.e. the product of bromination in the nucleus.

In the absence of a catalyst and under the influence of light, however, side-chain bromination takes place via radical intermediate stages. The reaction can be controlled in a targeted manner by varying the reaction conditions.

### Benefits

- Secure connection of the items by GL screw joint system
- Stable and safe setup due to solid stand material

### Tasks

1. Brominate toluene using bromine.
2. Change the reaction conditions to optimize your results.
3. Distillate the resulting mixture.

### Learning objectives

- Bromine
- Toluene
- Lewis acid
- Bromination
- Distillation

## Scope of delivery

Support base DEMO	02007-55	1
Support rod, stainless steel, different lengths	02037-00	2
Retort stand, h = 750 mm	37694-00	1
Right angle boss-head clamp	37697-00	3
Universal clamp	37715-01	3
Lab jack, 200 x 200 mm	02074-01	1
Three neck round bottom flask, 100 ml	MAU-27220501	1
Liebig Condenser, with head, GL18/8	MAU-27223000	1
Dropping funnel, 50 ml, Gl 18	MAU-27222000	1
Round-bottom flask, 50 ml	MAU-27220001	5
Adapter for 4 flasks, GL25	MAU-27227500	1
Cristallizing dish, boro 3.3, d = 60 mm	46244-00	1
Lab thermometer, w.stem, -10..+250C	38061-01	1
Magnetic stirrer with heater MR Hei-Standard	35753-93	1
Magnetic stirring bar 15 mm, cylindrical	46299-01	1
Magnetic stirring bar 30 mm, cylindrical	46299-02	1
Magnetic stirring bar, 50 mm, cylindrical	46299-03	1
Separator for magnetic bars	35680-03	1
Graduated cylinder, Borosilicate, 1000 ml	36627-00	2
Beaker, boro, low-form	46055-00	1
Secure bottle, 500 ml, 2 x Gl 18/8, 1 x 25/12	34170-01	1
Spring manometer, 0...-1000 mbar	34170-02	1
Glass tube, right-angled, .	MAU-10030703	1
Glass tubes, right-angled, 150 x 80 mm	MAU-10022500	1
Stopcock, 3-way, t-shaped, glass	36731-00	1
Water jet pump, plastic	02728-00	1
Funnel, glass, top dia. 50 mm	34457-00	1

Test tube, various lengths	37656-10	1
Test tube rack, wood, for 6 tubes d= 22mm	MAU-20042200	1
Pasteur pipettes, 250 pcs	36590-00	1
Rubber caps, 10 pcs	39275-03	1
Bromine filler w. rubber cap	45100-00	1
Rubber gloves, size L (9), one pair	39324-00	1
Teclu burner, DIN, natural gas	32171-05	1
Safety gas tubing, DVGW, sold by metre	39281-10	1
Lighter f.natural/liquified gases	38874-00	1
Hose clip f.12-20 diameter tube	40995-00	2
Hose clip, diam. 8-16 mm, 1 pc.	40996-02	2
Spoon, special steel	33398-00	1
Glass rod,boro 3.3,l=300mm, d=7mm	40485-05	1
Wash bottle, plastic, 500 ml	33931-00	1
Rubber hose	39282-00	3
Rubber hose for vacuum	39286-00	2
Silicone oil 500 ml	31849-50	1
Dichloromethane 250 ml	31255-25	1
Toluene 250 ml	30236-25	1
Bromine-Solution, 250 ml	30046-25	1
Zinc chloride, dry, 250 g	31983-25	1
Nitric acid , 65% 1000 ml	30213-70	1
Copper foil, 0.1 mm, 100 g	30117-10	1
Water, distilled 5 l	31246-81	1