

## Ammonia preparation from the elements (Haber-Bosch process)

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### Principle

Ammonia (which is of technical and economic importance) is obtained from the reaction of nitrogen with hydrogen. But this reaction is strongly inhibited (high activation energy is needed to start the reaction) and leads normally to poor yields. Because of this reason Fritz Haber and Carl Bosch developed a process for ammonia which is still used today. This process is called "Haber process". This experiment shows, in a simplified manner the principle of this "Haber process".

### Learning objectives

- Haber-Process
- Preparation of ammonia

## Scope of delivery

Support base DEMO	02007-55	1
Base plate for support base DEMO	02007-01	1
Support rod, stainless steel, different lengths	02037-00	2
Right angle boss-head clamp	37697-00	5
Universal clamp	37715-01	5
Lab jack, 150 x 150 mm	02074-02	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
Combustion tube, 300 mm, quartz, ns	33948-01	1
Connecting tube IGJ 19/26-GL 18/8	35678-01	2
Gas washing bottle, 100 ml	36691-00	1
Clamp f.ground joint,plastic,NS19	43614-00	2
Clamp for ground joint, plastic, IGJ29	43615-00	1
Teflon sleeve IGJ 19, 10 pcs	43616-00	1
Teflon sleeve IGJ 29, 10 pcs	43617-00	1
Stopcock,3-way,t-shaped, glass	36731-00	1
Test tube GL25/8, w.hose connec.	MAU-27221000	2
Glass tubes,right-angled	MAU-10030701	1
Glass tube,right-angled w.tip	MAU-10030704	1
Steel cylinder Nitrogen,2l,full	41777-00	1
Steel cylinder hydrogen, 2 l, full	41775-00	1
Reducing valve f.nitrogen	33483-00	1
Reducing valve for hydrogen	33484-00	1
Table stand for 2 l steel cylinders	41774-00	2
Wrench for steel cylinders	40322-00	1

Test tube, various lengths	37656-10	1
Wash bottle, plastic, 500 ml	33931-00	1
Rubber hose	39282-00	4
Spoon, special steel	33398-00	1
Tweezers, straight, blunt, 200 mm	40955-00	1
Pasteur pipettes, 250 pcs	36590-00	1
Rubber caps, 10 pcs	39275-03	1
Glass wool 10 g	31773-03	1
Phenolphthalein, 0,5% solution in ethanol, 100 ml	31715-10	1
Water, distilled 5 l	31246-81	1
Bead catalyst, 50g	31763-03	1