

Ammonia preparation from the elements (Haber-Bosch process)

Article no: P1140700



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. Beacuse 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

Base plate for support base DEMO 02007-01 1 Support rod, stainless steel, different lenghts 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 Tectlu 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 farground joint, plastic, IGJ29 43614-00 2 Clamp for ground joint, plastic, IGJ29 43615-00 1 Teflon sleeve IGJ 29, 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, whose connec. MAU-27221000 2	Support base DEMO	02007-55	1
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-10030704 1 Steel cylinder Nitrogen, 21, full 41775-00 1 Steel cylinder hydrogen, 21, full 41775-00 1	Base plate for support base DEMO	02007-01	1
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 Stopcock, 3-way, t-shaped, glass 36731-00 1 Test tube GL25/8, w.hose connec. MAU-10030701 1 Glass tube, right-angled MAU-10030704 1 Steel cylinder Nitrogen, 21, full 41777-00 1 Steel cylinder hydrogen, 21, full 41775-00 1 Reducing valve for hydrogen 33484-00 1	Support rod, stainless steel, different lenghts	02037-00	2
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-2221000 2 Glass tube, right-angled w.tip MAU-10030704 1 Steel cylinder Nitrogen, 21, full 41777-00 1 Steel cylinder hydrogen, 21, full 41777-00 1 Reducing valve for hydrogen 33484-00 1	Right angle boss-head clamp	37697-00	5
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-10030701 1 Glass tubes, right-angled MAU-10030704 1 Steel cylinder Nitrogen, 21, filled 41777-00 1 Steel cylinder Nitrogen, 21, full 41775-00 1 Reducing valve for hydrogen 33483-00 1 Table stand for 21 steel cylinders 41774-00 2	Universal clamp	37715-01	5
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, 21, full 41777-00 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	Lab jack, 150 x 150 mm	02074-02	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 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 tuber, right-angled w.tip MAU-10030704 1 Steel cylinder Nitrogen, 2l, filled 41777-00 1 Steel cylinder hydrogen, 2l, full 41775-00 1 Reducing valve for hydrogen 33483-00 1 Reducing valve for hydrogen 33484-00 1 Table stand for 2 l steel cylinders 41774-00 2	Teclu burner, DIN, natural gas	32171 - 05	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 43617-00 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 Steel cylinder Nitrogen, 2l,filled 41777-00 1 Steel cylinder Nitrogen, 2l, filled 41777-00 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	Safety gas tubing, DVGW, sold by metre	39281-10	1
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, filled 41777-00 1 Steel cylinder hydrogen, 2l, 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	Lighter f.natural/liquified gases	38874-00	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, 2 l, full 41777-00 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	Hose clip f.12-20 diameter tube	40995-00	2
Gas washing bottle, 100 ml 36691-00 1 Clamp f.ground joint, plastic, NS19 43614-00 2 Clamp for ground joint, plastic, 1GJ29 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,filled 41777-00 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	Combustion tube, 300 mm, quartz, ns	33948-01	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,filled 41777-00 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	Connecting tube IGJ 19/26-GL 18/8	35678-01	2
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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, filled 41777-00 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	Clamp f.ground joint,plastic,NS19	43614-00	2
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,filled 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	Clamp for ground joint, plastic, IGJ29	43615-00	1
Stopcock,3-way,t-shaped, glass36731-001Test tube GL25/8, w.hose connec.MAU-272210002Glass tubes,right-angledMAU-100307011Glass tube,right-angled w.tipMAU-100307041Steel cylinder Nitrogen,2l,filled41777-001Steel cylinder hydrogen, 2 l, full41775-001Reducing valve f.nitrogen33483-001Reducing valve for hydrogen33484-001Table stand for 2 l steel cylinders41774-002	Teflon sleeve IGJ 19, 10 pcs	43616-00	1
Test tube GL25/8, w.hose connec. Glass tubes,right-angled MAU-10030701 1 Glass tube,right-angled w.tip MAU-10030704 1 Steel cylinder Nitrogen, 2l, filled 41777-00 1 Steel cylinder hydrogen, 2 l, full Reducing valve f.nitrogen 33483-00 1 Reducing valve for hydrogen 33484-00 1 Table stand for 2 l steel cylinders	Teflon sleeve IGJ 29, 10 pcs	43617-00	1
Glass tubes,right-angled MAU-10030701 1 Glass tube,right-angled w.tip MAU-10030704 1 Steel cylinder Nitrogen,2l,filled 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 2	Stopcock,3-way,t-shaped, glass	36731-00	1
Glass tube,right-angled w.tip Steel cylinder Nitrogen,2l,filled 41777-00 1 Steel cylinder hydrogen, 2 l, full Reducing valve f.nitrogen 33483-00 1 Reducing valve for hydrogen 33484-00 1 Table stand for 2 l steel cylinders	Test tube GL25/8, w.hose connec.	MAU-27221000	2
Steel cylinder Nitrogen,2l,filled41777-001Steel cylinder hydrogen, 2 l, full41775-001Reducing valve f.nitrogen33483-001Reducing valve for hydrogen33484-001Table stand for 2 l steel cylinders41774-002	Glass tubes,right-angled	MAU-10030701	1
Steel cylinder hydrogen, 2 l, full41775-001Reducing valve f.nitrogen33483-001Reducing valve for hydrogen33484-001Table stand for 2 l steel cylinders41774-002	Glass tube, right-angled w.tip	MAU-10030704	1
Reducing valve f.nitrogen33483-001Reducing valve for hydrogen33484-001Table stand for 2 l steel cylinders41774-002	Steel cylinder Nitrogen,2l,filled	41777-00	1
Reducing valve for hydrogen 33484-00 1 Table stand for 2 l steel cylinders 41774-00 2	Steel cylinder hydrogen, 2 l, full	41775-00	1
Table stand for 2 l steel cylinders 41774-00 2	Reducing valve f.nitrogen	33483-00	1
	Reducing valve for hydrogen	33484-00	1
Wrench for steel cylinders 40322-00 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% soution in ethanol, 100 ml	31715-10	1
Water, distilled 5 l	31246-81	1
Bead catalyst, 50g	31763-03	1

