

Combustion of ammonia to produce nitrogen dioxide - Ostwald process

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Principle

In the presence of a suitable catalyst and while giving off heat, ammonia-air mixtures burn and form nitrogen monoxide and water. Nitrogen monoxide reacts immediately with the excess oxygen, thereby forming nitrogen dioxide. At higher temperatures, nitrogen monoxide is decomposed into nitrogen and oxygen. In the presence of water and oxygen, nitrogen dioxide forms nitric acid. On a large industrial scale, the combustion of ammonia with atmospheric oxygen is performed under contact with platinum (Ostwald process).

Benefits

- Introduction to the Ostwald process
- Practical water jet pump for easy generation of the required negative pressure
- Stable and safe setup due to solid stand material

Tasks

Burn an ammonia-air mixture in the presence of a catalyst (platinum-palladium-aluminium-oxide beads) and prove the resulting nitrogen oxide.

Learning objectives

- Ostwald process
- Ammonia
- Nitrogen dioxide
- Nitrogen monoxide
- Nitric acid

Scope of delivery

Support base DEMO	02007-55	1
Support rod, stainless steel, different lengths	02037-00	2
Right angle boss-head clamp	37697-00	3
Universal clamp	37715-01	3
Test tube GL25/8, w.hose connec.	MAU-27221000	2
Glass tube, straight, l=80 mm, 10/pkg.	MAU-16074541	1
Glass tubes,right-angled	MAU-10030701	1
Gas washing bottle, 100 ml	36691-00	1
Clamp for ground joint, plastic, IGJ29	43615-00	1
Teflon sleeve IGJ 29, 10 pcs	43617-00	1
Rubber stopper, d = 22/17 mm, 1 hole	39255-01	2
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
Water jet pump, plastic	02728-00	1
Rubber hose for vacuum	39286-00	1
Rubber hose	39282-00	1
Funnel, glass, top dia. 50 mm	34457-00	1
Beaker, Boro, high-form	46032-00	1
Glass rod,boro 3.3,l=300mm, d=7mm	40485-05	1
Tweezers,straight,blunt, 200 mm	40955-00	1
Wash bottle, plastic, 500 ml	33931-00	1
Pasteur pipettes, 250 pcs	36590-00	1
Rubber caps, 10 pcs	39275-03	1
Glass wool 10 g	31773-03	1
Iron wool 200 g	31999-20	1

Litmus, powder 25 g	31517-04	1
Ammonia solution, 25% 1000 ml	30933-70	1
Glycerol, 250 ml	30084-25	1
Water, distilled 5 l	31246-81	1
Bead catalyst, 50g	31763-03	1