

MACHINE LEARNING TOOLS IN IP

ANA EUGÉNIO

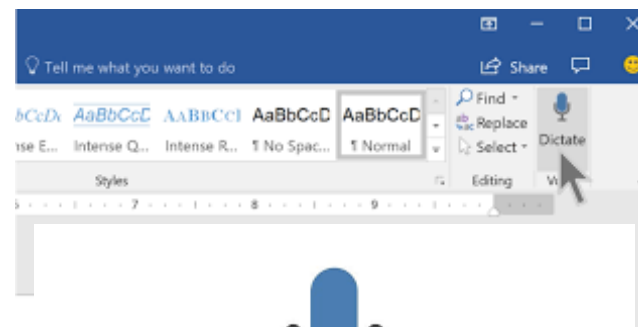
SENIOR PATENT COUNSEL @TOPSOE

Perfecting chemistry
for a better world



ML TOOLS TESTED

PATENT DRAFTING & PRIOR ART SEARCH



Don't type. Talk.

AMBIENT AIR SEPARATION AND SOEC FRONTEND FOR AMMONIA PRODUCTION

TEXT INPUT TO ML TOOLS

- The **invention** is a method for ammonia production wherein compressed air which is fed into an electrolysis unit, preferably an SOEC, is going through an air separation process upstream the electrolysis step, in which the content of nitrogen is concentrated and the content of oxygen and carbon dioxide (CO₂) is diluted. Optionally, a PSA/TSA is used. By combining with partial air separation, improved process integration can be achieved as the oxygen in the air feed can be balanced to exactly match the required steam production in the SOEC combined with the ammonia loop. Additionally, the upstream air separation reduces the content of other impurities in the air, especially CO₂. By reduction of CO₂ upstream the SOEC allows for a simplification of the layout as potential CO/CO₂ removal upstream the ammonia loop potentially can be avoided, or at least simplified.
- By using the configuration of the present invention, the following **advantages** are obtained:
 - A smaller SOEC is used
 - Lower concentration of CO/CO₂ in the synthesis gas to the ammonia loop
 - Improved process integration in decreased steam production
- Closest **prior art** ([WO 2019/072608](#)) describes a process where synthesis gas for ammonia production is prepared, using SOEC alone. The concept uses a combination of water electrolysis and air combustion to facilitate high temperature electrolysis of steam, which effectively means that any oxygen in the water and air feed can be separated in a separate stream while leaving an intermediate product of H₂/N₂ in a ratio suitable for ammonia production.

HOW EASY IS IT TO DRAFT A PROPER CLAIM?

PEANUT BUTTER SANDWICH CHALLENGE



Copyright by Toaster Oven Love

CLAIM DRAFTING - RESULTS

CLAIM 1

INTERNAL CHATGPT

1. A method for producing ammonia syngas using electrolysis, the method comprising the steps of:

- a. Feeding compressed air into an electrolysis unit;
- b. Subjecting the compressed air to an air separation process upstream of the electrolysis process, wherein the content of nitrogen is concentrated, and the content of oxygen and CO₂ is diluted, resulting in a modified air composition;
- c. Passing the modified air composition through the electrolysis unit to generate ammonia syngas.

IP AUTHOR

1. A method for producing ammonia, comprising:

- a) receiving a gaseous input into an electrolysis apparatus;
- b) performing a gas separation process in the electrolysis apparatus to modify concentrations of specific gas components;
 - c) concentrating a specific gas component in the gas separation process;
 - d) diluting another specific gas component in the gas separation process;
 - e) balancing the production of a specific gas component with the specific gas component in the gaseous input;
 - f) integrating a specific process loop with a specific type of electrolysis apparatus; and
 - g) reducing unwanted gas components in the gaseous input.

MANUALLY DRAFTED & FILED

1. A method for generating ammonia synthesis gas by electrolysis, said method comprising the steps of:

- a) compressing air and feeding it to an air separation process, in which the content of nitrogen is concentrated while the content of oxygen and CO₂ is diluted,
- b) feeding a mixture of steam and the compressed and refined air into the electrolysis unit or into the first of a series of electrolysis units and
- c) passing the outlet from one electrolysis unit to the inlet of the next electrolysis unit, either together with air added after each electrolysis unit or only adding air after the last electrolysis unit,

wherein the electrolysis units are run in thermoneutral or endothermic mode and the nitrogen part of the synthesis gas is provided by burning the hydrogen produced by steam electrolysis by the refined air in or between the electrolysis units.

PRIOR ART REPORT (EXAMPLE)

Home

A method for producing ammonia syngas using electrolysis wherein compressed air is fed into the electrolysis unit and goes through an air separation process upstream the electrolysis process, in which the content of nitrogen is concentrated and the content of oxygen and CO2 is diluted. Alternatively, a PSA/TSA is used.

Prior Art

Modify Invention

Draft Claims

Novelty:

The invention is a method for producing ammonia syngas using electrolysis. Compressed air is fed into the electrolysis unit and goes through an air separation process upstream the electrolysis process, where the nitrogen content is concentrated and the oxygen and CO2 content is diluted. Alternatively, a PSA/TSA is used.

EP-3947780-A1

Dolcera Rank 0.97

Similarity

85

AMBIENT AIR SEPARATION AND SOEC FRONT-END FOR AMMONIA SYNTHESIS GAS PRODUCTION

Assignee: **Topsoe Holding A/S**

Priority Date: 2019-04-05

Similarity

Both the invention and the reference patent involve a method for producing ammonia syngas using electrolysis and an air separation process. However, the reference patent further includes the step of feeding a mixture of steam and the compressed and refined air into the electrolysis unit and passing the outlet from one electrolysis unit to the inlet of the next. The reference patent also provides more options for the air separation process.

Novelty Summary

The reference patent claims a method for generating ammonia synthesis gas by electrolysis, which involves compressing air and feeding it to an air separation process, feeding a mixture of steam and the compressed and refined air into the electrolysis unit, and passing the outlet from one electrolysis unit to the inlet of the next. The air separation process may comprise a polymer membrane unit, a ceramic membrane, a PSA unit or a TSA unit.

US-9139431-B2

Dolcera Rank 2.95

Similarity

85

Process and equipment for the production of ammonia make-up syngas with an air separation unit as nitrogen source

Assignee: **CASALE SA**

Priority Date: 2008-12-18

Similarity

The invention and the reference patent both involve the production of syngas for the synthesis of ammonia. However, the invention uses electrolysis and air separation, while the reference patent uses a reforming process and air separation. The novel aspects of the invention include the use of electrolysis and the concentration of nitrogen, while the novel aspects of the reference patent include the use of a primary reformer and an additional reformer.

Novelty Summary

The reference patent is a process for producing a makeup synthesis gas for the synthesis of ammonia. It involves reforming a hydrocarbon feedstock in a primary reformer, separating an air feed into a nitrogen stream and an oxygen-enriched air stream, and adding the nitrogen stream to the purified syngas. The oxygen-enriched air stream is fed to at least one additional reformer.

US-20200078728-A1

Dolcera Rank 2.3

Similarity

78

A PROCESS AND RELATING APPARATUS TO MAKE PURE HYDROGEN FROM A SYNGAS ORIGINATED FROM WASTES...

Assignee: **Glv Capital S.P.A.**

Priority Date: 2016-10-25

Similarity

The invention and the reference patent both involve processes related to gasification and electrolysis. However, the invention focuses on producing ammonia syngas, while the reference patent is about making Hydrogen from a syngas produced from carbon-matrix waste gasification. The novel aspects of the invention include the use of compressed air and an air separation process, while the reference patent's novelty lies in its comprehensive process for making Hydrogen from syngas.

Novelty Summary

The reference patent describes a process for making Hydrogen from a syngas produced from carbon-matrix waste gasification, without any emission of nitrogen and sulphur. The process includes pretreatment, conversion, removal, and purification steps. The H2S level into the syngas is controlled by adding waste containing S into the gasification reactor.

PRIOR ART SEARCH HITS - COMPARISON

CHATGPT, IP AUTHOR, PATBASE & SEARCH AUTHORITY

- Our **Internal ChatGPT** is prevented from doing a prior art search in patent databases and in non-patent literature.
- When asked about the method, without providing references, reply is: *"Please note that this method seems to be a novel approach addressing specific challenges associated with the "process" or "product/equipment". As such, it might be subject to patent protection. Always ensure to check for existing patents or patent applications to avoid infringement."*
- **Public ChatGPT** advises to consult with a patent attorney and suggests a few databases. Does however provide non-patent literature, which must be checked (hallucinations).

IP author provided the list:

- [EP 3947780](#) (85%), which is the exact application used for testing
- US 9139431 (85%), Casale
- US 2020/0078728 (78%), Giv C.
- WO 2022/145661 (65%), Wonik
- CN 112262106 (65%), Casale

Failed however to find the closest prior art [WO 2019/072608](#)

The patent attorney used **PatBase** for a brief search, obtaining (after optimizing search and screening results):

[WO 2019/020377](#), Topsoe

[WO 2019/072608](#) (CPA)

DE 1020192148, Thyssenkrupp

The **Danish Patent Office** provided a search report with the following prior art:

[WO 2019/072608](#) (CPA)

[WO 2019/020377](#), Topsoe

DE 2020/18106745, Hepu Tech

US2017/284667, Ostuni R.

CHATGPT™

HELPING OR MISLEADING?



- ✓ Writing a patent specification
- ✓ Searching definitions (cross-check)
- ✓ Drafting a letter, speech, report, presentation or opinion article
- ✓ Internal API platform gets smarter (confidentiality breach risk?) the more we use/feed it, therefore sharper



- Prior art search
 - No access to patent databases
 - Hallucinations (false literary references)
- Low quality claims (for now)
- Data privacy/Security/Confidentiality
- Wrong summary/conclusion based on correct information (e.g. Madonna)
- Knowledge cutoff date: January 2022

IP AUTHOR™

HELPING OR WASTING MY TIME?



- Flowcharts for illustrating a method, especially when having CIM claims
- Feeding claims and asking for the specification
- Fast drafting for urgent filings
- Drafted claims modifiable and specification adjusts accordingly
- Format of prior art search report



- Processing of large text – max 5000 words
- Drafting claims
- Flowcharts (technical contribute, accuracy)
- Saving original/modified text to (re)use later
- Prior art Search (accuracy, weblink to Google Patents, link to documents in word report)
- New wording/information beyond our input

DEAR ML, HOW ELSE CAN YOU HELP ME?

TURNING A DOCUMENT INTO A PRESENTATION

Dear AI, You are an expert presenter who knows how to communicate clearly and keep an audience's attention. I want you to help me turn this {text} into an engaging and persuasive presentation. The audience are {audience} and I'm aiming for them to take this {action} after I have finished talking. I have been given {time} to speak, so make sure you come up with something that can be delivered within that time. I want you to create a list of slides that the presentation should contain. For each slide I want you to list the headline, other media (image/video/gif) and the speaker's notes as a list of bullet points. Each slide should contain no more than 30 words so they don't distract from what I'm saying. Each slide should only talk about one thing. It's better to have more slides saying less than less slides saying more. Slides can also contain images, charts, diagrams and films, if they help communicate a point clearly.

- {audience}: Who are you going to be speaking to?
- {action}: What do you want them to do after you've spoken?
- {time}: How long do you have to speak?
- {text}: Paste your document text in here

Just replace the highlighted text with the right information and you'll get a logical structure and some suggestions of what to put on each slide.

Source: <https://davebirss.com/promptly-yours-email-signup/>; **Courses:** <https://www.linkedin.com/learning/instructors/dave-birss>

RECAP

MACHINE LEARNING TOOLS

Opportunities

- ✓ Less time wasted in iterative tasks
- ✓ More patent applications drafted and filed
- ✓ More litigation
- ✓ Broader reach in patent and non-patent search
- ✓ 24/7 assistance in drafting patent specification, FTO reports, etc.
- ✓ [AI Act](#): we can be part of the conversation – how would you regulate AI from an IP point of view?
- ✓ Other?

Concerns

- IP attorneys partially or entirely replaced by ML/AI
- Low quality claims drafted by ML/AI
- False data
- False references (prior art)
- IP ownership
- Accountability
- [Regulation in Europe: AI Act](#)
- Other

Q&A



Image by Chris Madden Cartoons©

THANK YOU

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