



FIST SA

High purity hydrogen production from steel slags

Notre référence :
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Status des brevets

European priority patent application 13305411.4 filed on March 29, 2013 and entitled "Method for producing high-purity hydrogen gas"



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Status Commercial

Exclusive or non-exclusive license

Laboratoires

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CONTEXT

Hydrogen can be produced in several ways. However, known methods all exhibit drawbacks. They are either expensive, high energy consuming or produce greenhouse gases.

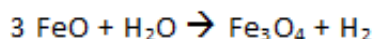
Hydrogen purity is also paramount. If hydrogen is to be used in hydrogen fuel cells, high degree of purity is indeed critical as even trace amounts of impurities present in the hydrogen can poison the anode, membrane, and cathode of the fuel cell resulting in performance drops.

These past years, new routes were investigated to produce hydrogen. It was eventually proposed to produce hydrogen by thermochemical decomposition of water using steel slags. Although the proposed process offers a way to valorize steel slags, it produces hydrogen of low purity and may present safety risk as H₂ may explode at the working temperature.

There remains then a demand for a method that would allow producing high purity hydrogen at low cost without greenhouse gases emissions and which could advantageously allow valorizing attractively steel slags.

TECHNICAL DESCRIPTION

In the present work, the inventors have developed a method for producing hydrogen gas based on the valorization of steel slags by reacting a reduced form of iron (wüstite from steel slags) with H₂O at moderate temperature (below 500°C).



The gas is extracted and cooled down to separate hydrogen gas from water steam. A convenient method is also proposed to characterize the hydrogen yield using magnetic monitoring.

BENEFITS

Hydrogen gas produced by the method of the present invention exhibits a purity of at least 99.9%. In some embodiments, a purity of at least 99.995% may be achieved.

The method can also be carried out in batch or in continuous and can produce up to 25L or 30L of H₂ per kg of slags.

INDUSTRIAL APPLICATIONS

The present invention aims at providing an alternate way of producing highly pure hydrogen for any applications. Among the most promising applications, one can cite fuel cell.

DEVELOPMENT STAGE

Many experiments were successfully carried out for the production of H₂ on a laboratory

France

scale.

For further information, please [contact us](#) (Ref 05760-01)

Mots clés :

Steel slags high purity
hydrogen fuel cell
recycling magnetite
