

ELECTRICITY FROM URINE

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Introduction:

Electricity is a very important resource to run our lives. We cannot expect a day without electricity. There are various sources of producing electricity---i)Renewable Energy resource and ii)Non Renewable Energy resource. Non-renewable energy resources are nowadays getting exhausted. So we should focus on renewable energy resources for producing electricity. Keeping all this things in mind, we have come to an idea of **Producing Electricity from Urine**, which is a pollution free, cost effective and multiple application way of producing electricity. Scientists are researching on the basis to develop a pollution free renewable energy to generate electricity .This can be an effective way.

Main Body:

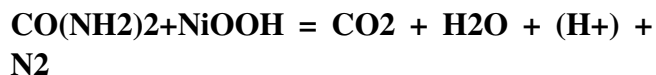
Human Urine is an aqueous solution of more than 95% Water, other constituents include **Urea, Chloride, Sodium**, and other dissolved ions, inorganic and organic compounds. **Urea(CO(NH₂)₂)**, the main constituent of Urine, can be split into Hydrogen (using electrodes) and the Hydrogen can be send to an alkaline fuel cell to produce electricity. Also as a by-product we will get purified water which is suitable for drinking purposes.

The electrode reactions particularly the cathode reduction of oxygen is very slow and to increase the electric power from this fuel cell, the pores of electrodes are impregnated with platinum

catalyst. The platinum catalyst speeds up the both oxidation and reduction reactions at the electrodes and the cell performance becomes better. Current drawn from a cell can be increased by increasing active area of each electrode. Since,**Platinum(Pt.)** is a very costly substance,extensive research work is being done to find out less expensive catalysts.

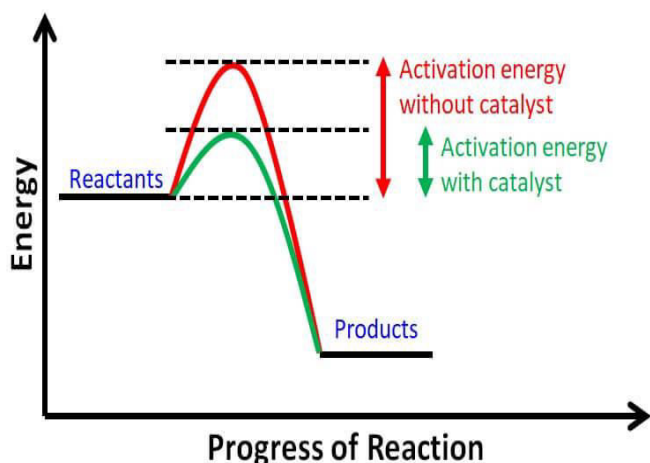
Catalyst while producing (H+) ion :

Catalysts are the chemical substances that are used to accelerate the rate of a chemical reaction by increasing the activation energy. Now, while separating the hydrogen atoms from Urea, we need Platinum as catalyst, otherwise it would become a First Order Reaction. Now Platinum is much costly and is not available everywhere. For this reason, we are substituting the Platinum catalyst with **NiOOH**.



The preferred pathway for electro-oxidation was found to be: **CO(NH₂)₂→ CO(NH.NH₂)→ CO(NH.NH)→ CO(NH.N)→CO(N₂) → CO(OH) →CO(OH.OH) →CO₂ +H₂O**

The (H⁺) ion is generated due to the addition of **NiOOH**. Thus, the cost of using the expensive catalyst Platinum(Pt.) can be cut down using the **NiOOH**as catalyst.



the most beautiful form of energy has not yet reached .

Reference :

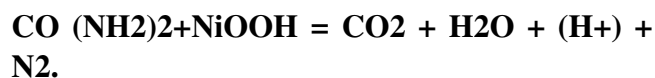
A thesis presented to the faculty of the Russ College of Engineering and Technology of Ohio University by Deepika Singh.

Picture link : <https://www.google.com>

Efficiency Factor :

This is a multi-efficient study :

In the first part of the reaction, when (H⁺) ions are produced using NiOOH as catalyst, we get three by products along with (H⁺) ions.



Now, The CO₂ and N₂ emitted while producing H⁺ ions can be sent through a pipeline to the **Fertilizer Industries** which can be further used for preparing fertilizers. Also, the H₂O generated after electrolysis is distilled in nature. It can be supplied as **drinking water**.

As efficiency is a factor in any process, Hydrogen can be produced at Rs 48.3(\$0.69)/Kg based on electricity cost of Rs 4.9(\$0.07) KW/H in India.

Conclusion :

Some countries like Nigeria, China are using renewable and pollution free energy resources for the production of electricity. In India, as Electricity and Hydrogen together represent one of the most promising ways to achieve pollution free, zero waste environment, so we should think of this idea to produce Electricity and to make the lives of those people colorful to whom till today